GAS JOURNAL

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Vol. 202. 85th Year. LONDON, JUNE 14, 1933. No. 3656. Price 1s.

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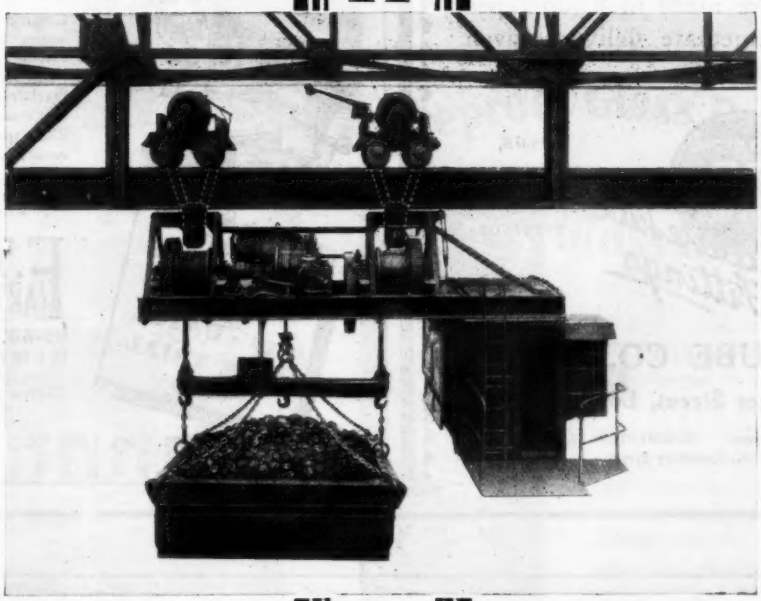

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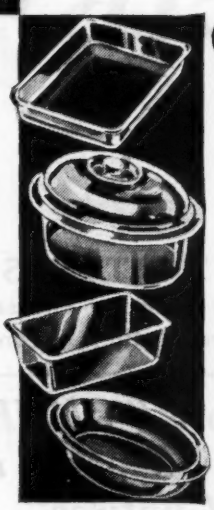

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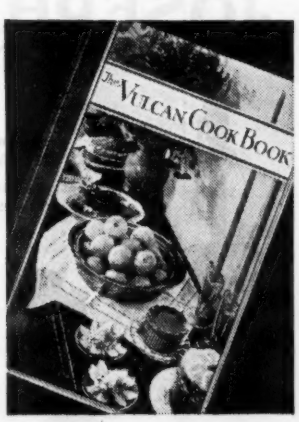

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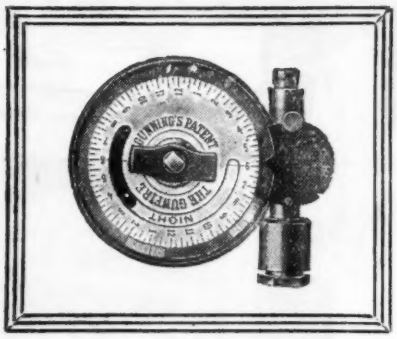

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FIG. 105

FIG. 256

FIG. 257

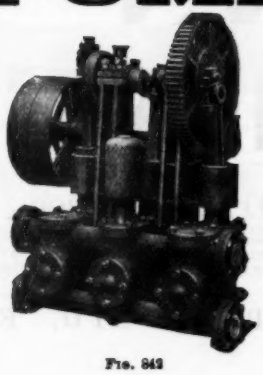
FIG. 842

FIG. 187

FIG. 69

FIG. 224

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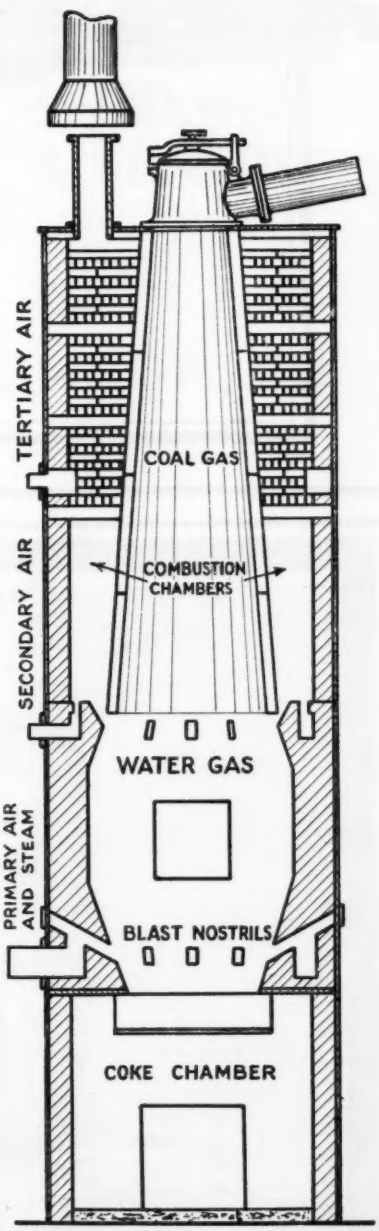

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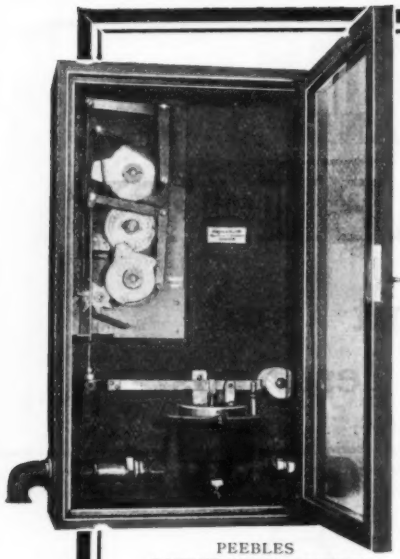

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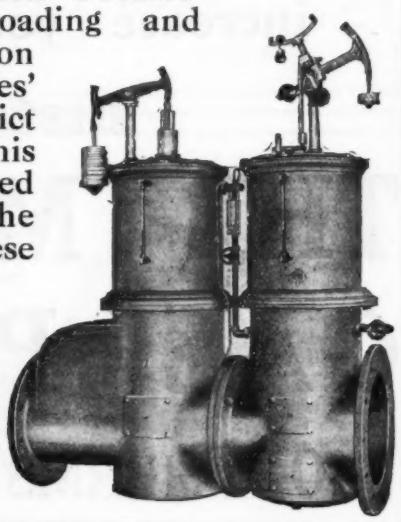

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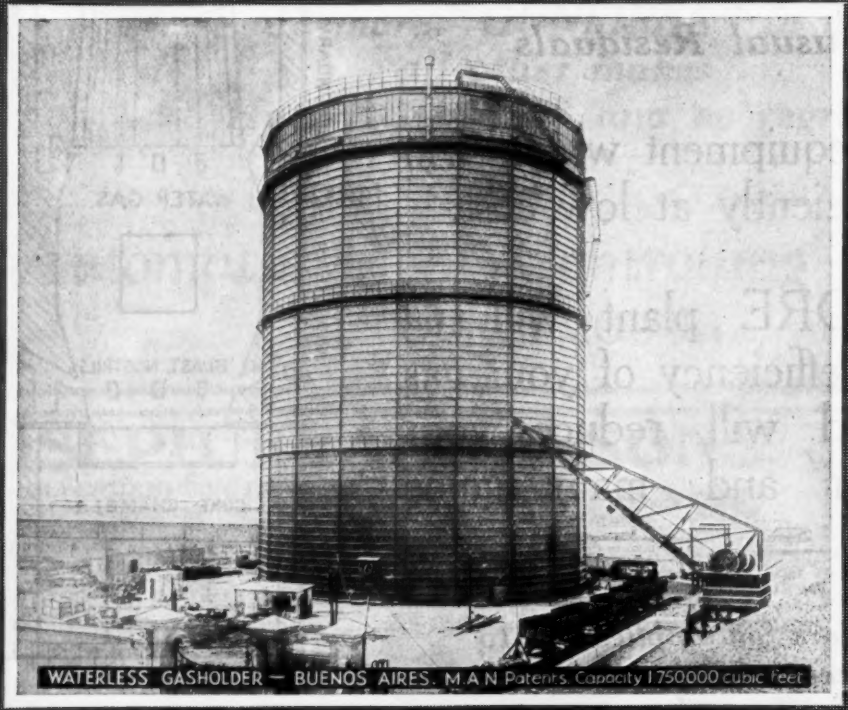

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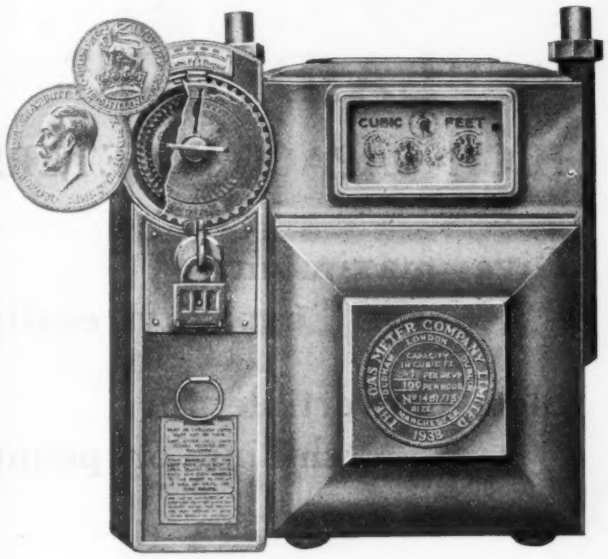

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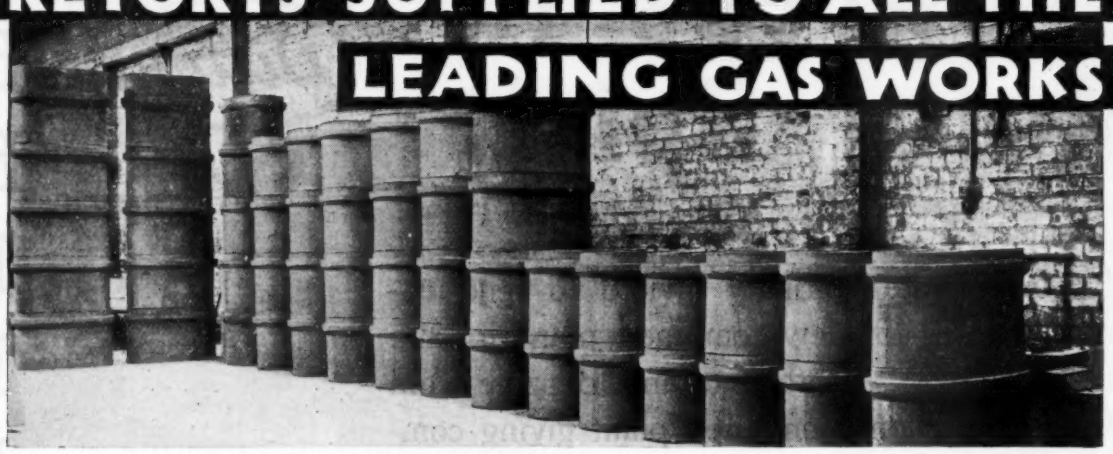

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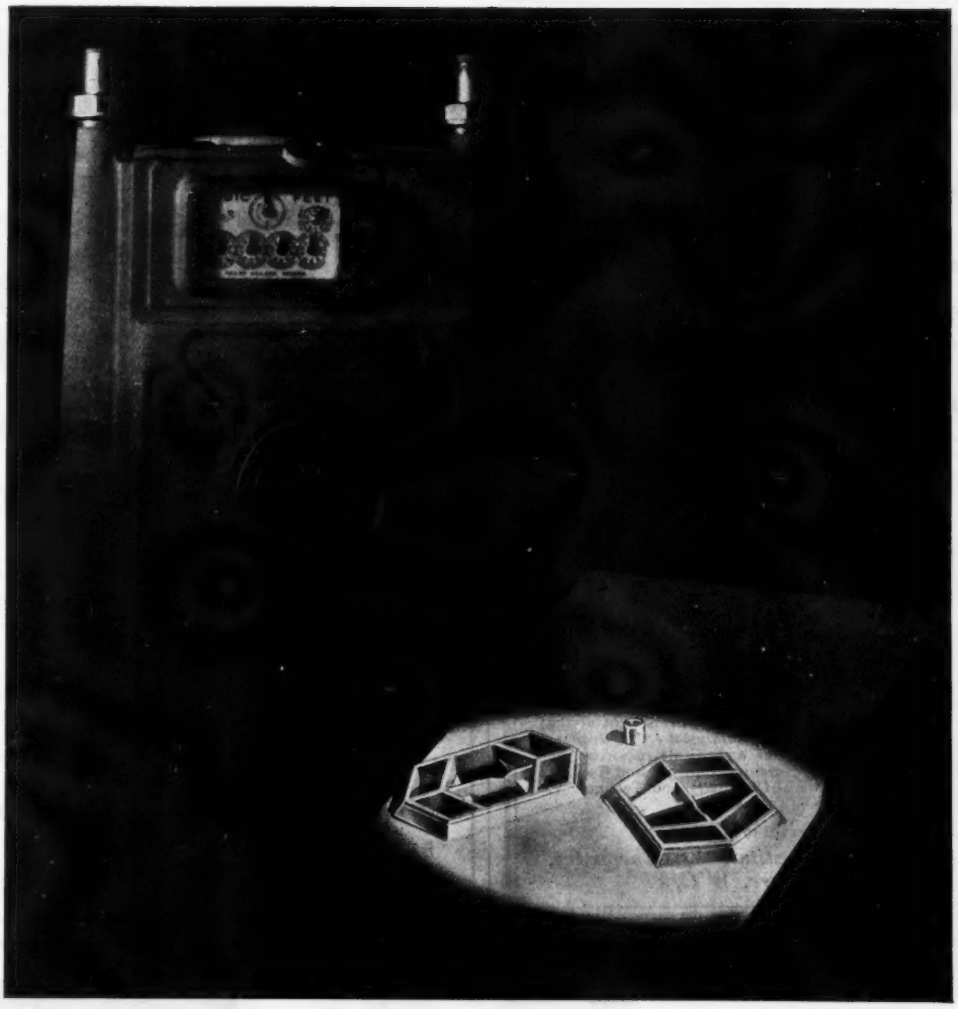

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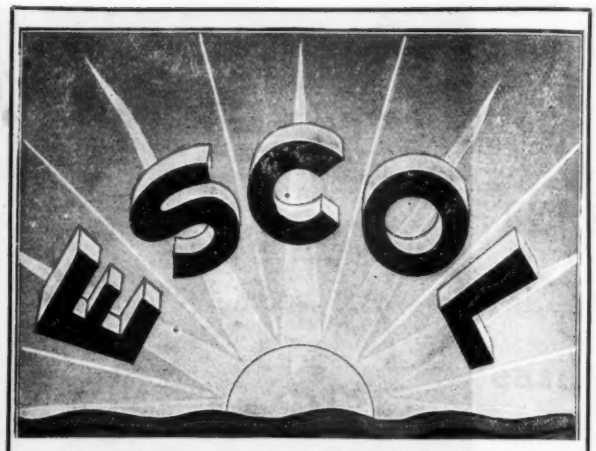

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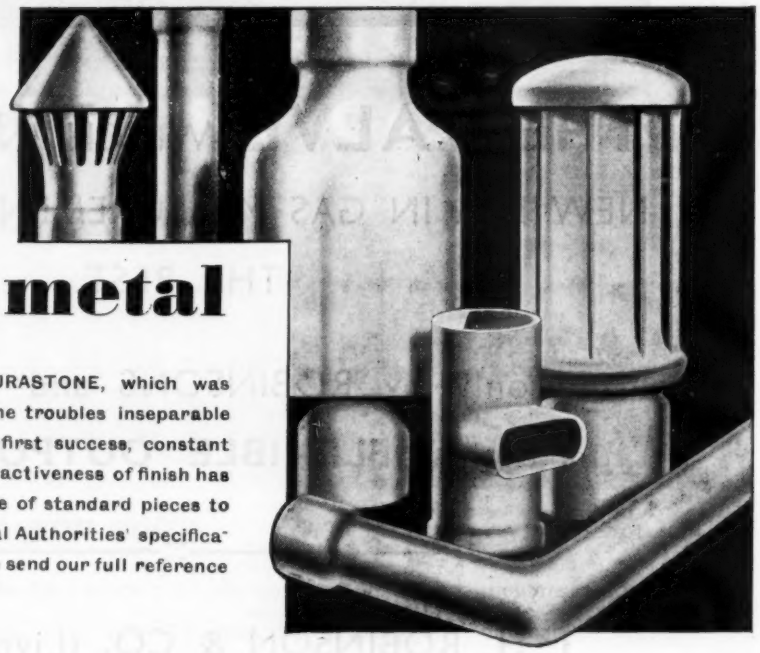

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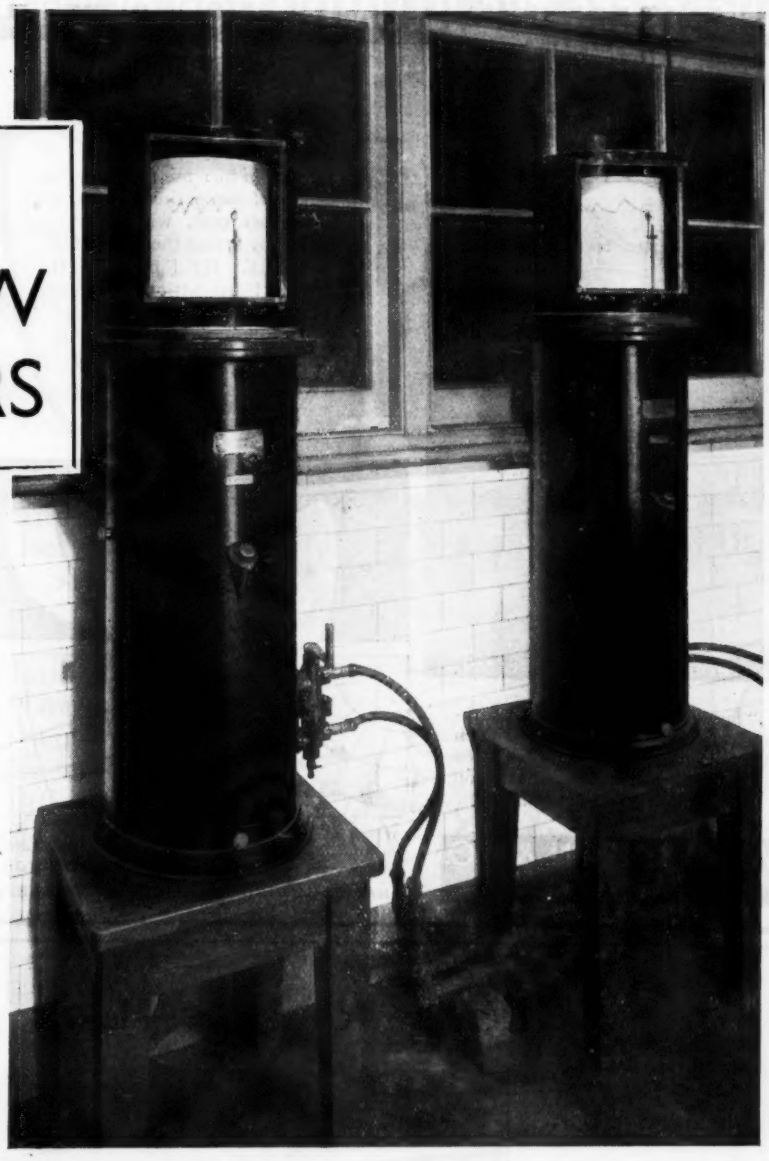

Two Arkon Gas Flow Recorders at the Southall Works of the Gas Light & Coke Co.

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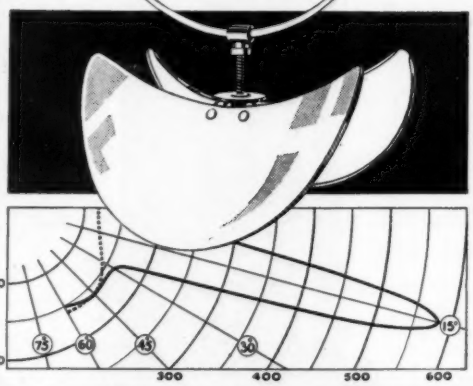

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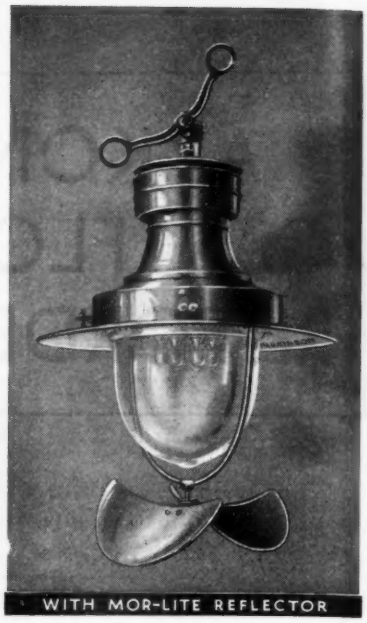

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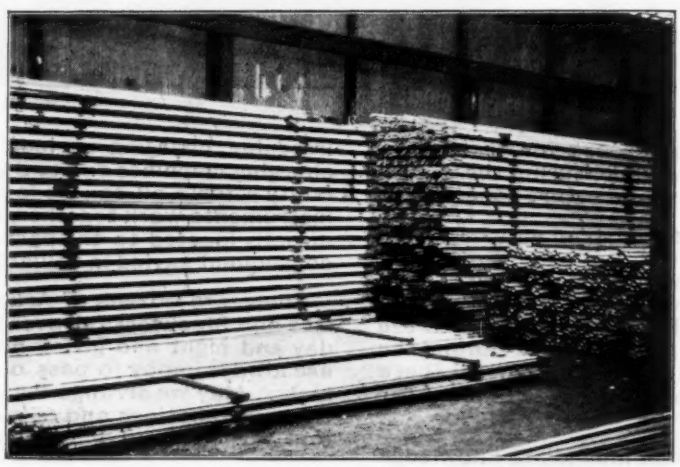

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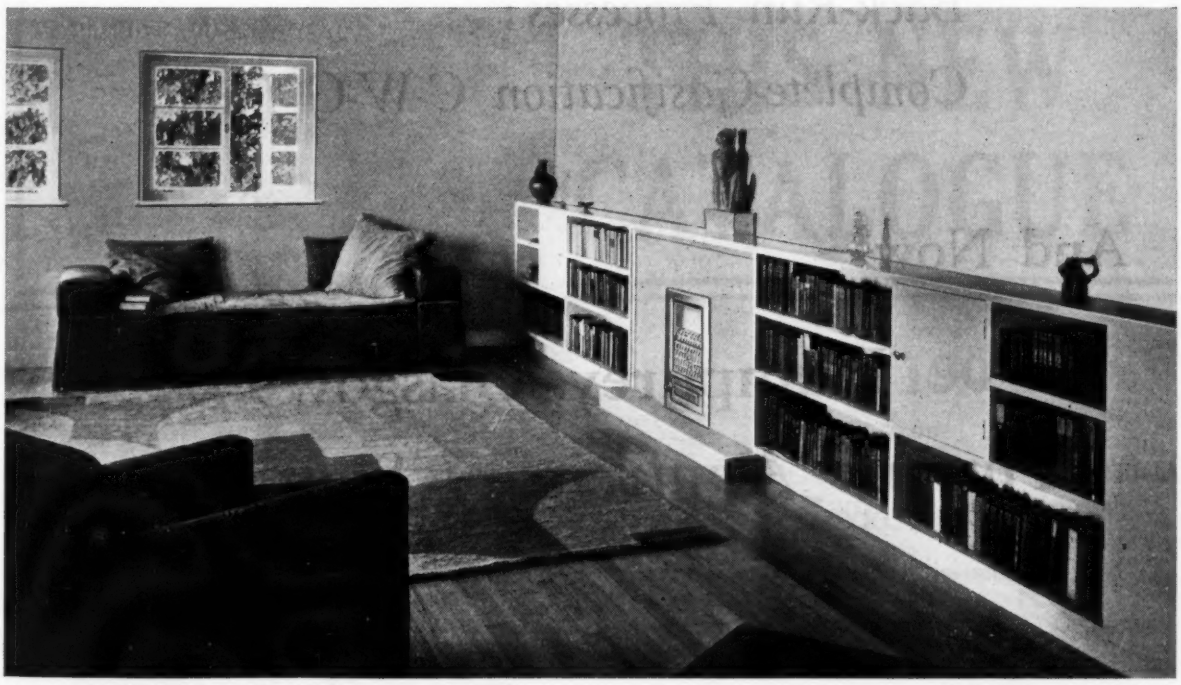

A Setting of the "Panella" Gas Fire. *Marshall Sisson, A.R.I.B.A.*

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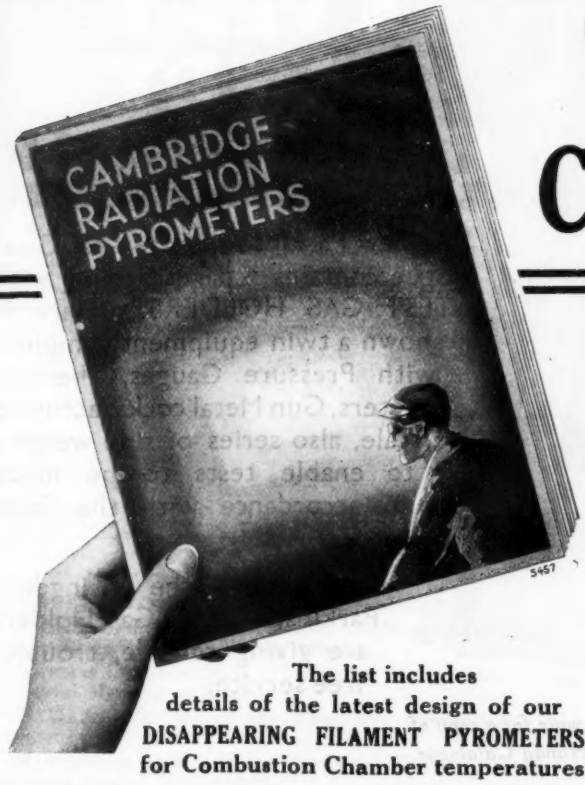

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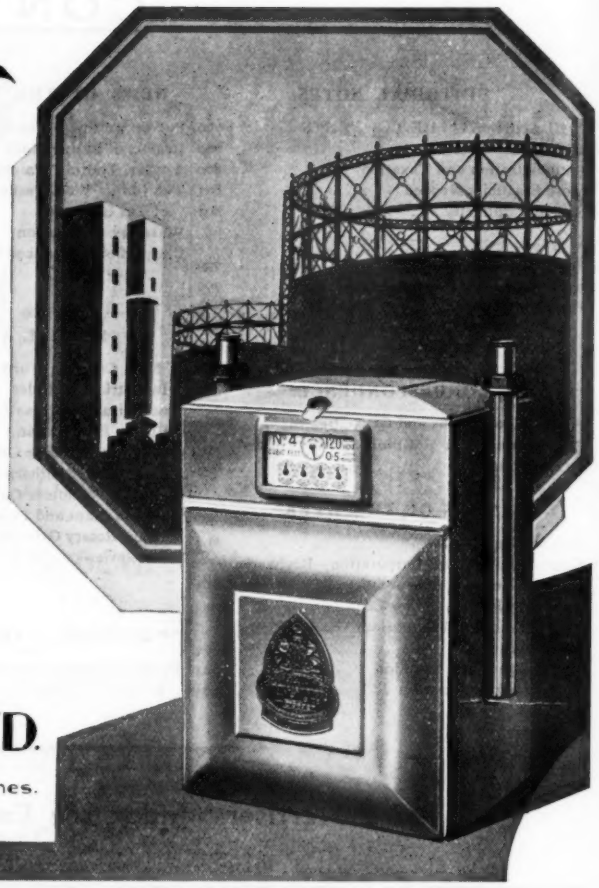

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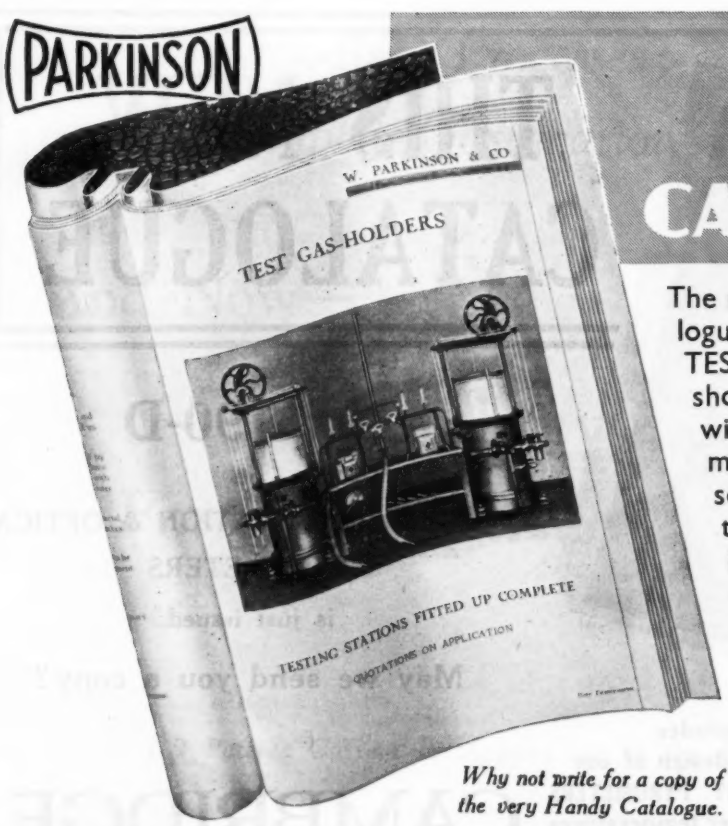

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THE GAS JOURNAL

JUNE 14, 1933

Vol. 202. 85th Year No. 3656

A Glance at the Contents—

Croydon Gas Company's Co-Partnership.

A large gathering of co-partners and their wives attended the Eleventh Annual Meeting of co-partners in the Croydon Gas Company, held on Tuesday, May 30, at the North End Hall, Croydon. [p. 816.]

A New Crucible Furnace.

Interesting details and illustrations are given of the "Efficiency" gas fired natural-draught crucible furnace, which has been designed to replace the coke-fired pit furnace, and only requires a flue about 16 to 20 ft. high and 5 in. in diameter. [p. 806.]

Direct Recovery of Standard Road Tars.

In a paper before the Midland Section of the Coke Oven Managers' Association, Mr. F. Cooke, F.I.C., relates the progress made in a process for the production of road tar which has been developed at the coke oven plant at Wombwell Main Collieries, Barnsley. [p. 811.]

Consumers' Technical Adviser Required.

A Corporation in the Midlands is inviting applications for the post of Consumers' Technical Adviser. The commencing salary is £255 per annum, and applicants must have experience of design and working of gas furnaces for central heating and industrial purposes. [p. 824.]

Board of Trade Inquiry at Coatbridge.

A Board of Trade Inquiry was held in the Municipal Chambers, Coatbridge, Lanarkshire, into an application by the Coatbridge Gas Company for a re-definition and extension of its existing limits of supply, and for powers to levy differential charges (*a*) in parts of its existing limits, and (*b*) in certain proposed added limits. [p. 817.]

Two-Part Tariff at Rotherham.

The results of a six months' test of the working of Rotherham's two-part system of charge are summarized on p. 805.

London Juniors' Summer Outing.

Members of the London and Southern District Junior Gas Association and their friends had an enjoyable time on Saturday, June 10, when their annual summer visit and ladies' day was spent at Southampton. [p. 810.]

Mechanized Accounting for Gas Offices.

Mr. C. Ralph Curtis, B.Sc. (Econ.), describes some of the applications which have been found for the so-called "punched card system" of accounting, which has been adopted in the rental offices of some of the larger gas companies. [p. 807.]

Creosote and Coal Gas for Motor Vehicles.

In a paper before the Tramways, Light Railways, and Transport Association last week, Mr. D. E. Bell, General Manager of the Yorkshire (Woollen District) Electric Tramways, Ltd., discussed the use of creosote oil and compressed coal gas as motor fuel. [p. 809.]

Leeds University.

From our Advertisement Columns it will be seen that two important Scholarships tenable at the Department of Coal Gas and Fuel Industries, Leeds University, are offered for competition. The Corbet-Woodall Scholarship, of the value of £60 per annum, is for a period of three years, with power of extension for a fourth year. The William Cartwright Holmes Scholarship, value £120 a year, is tenable for a period of one, two, or three years, with power of extension for a fourth year. [p. 824.]

Forthcoming Engagements

June 15.—S.B.G.I.—Meeting of Council, 11.30 a.m.

June 15.—I.G.E.—Meeting of Refractory Materials Joint Sub-Committee, Stoke-on-Trent, 2.30 p.m.

June 15.—SOUTHERN ASSOCIATION (WESTERN DISTRICT).—Commercial Meeting at Exeter.

June 21.—B.C.G.A.—Meeting of the Executive Committee at 12 noon, 28, Grosvenor Gardens, S.W. 1.

June 23.—MANCHESTER DISTRICT ASSOCIATION.—Visit to the President's Works, Nottingham.

June 23.—WAVERLEY ASSOCIATION.—Annual Meeting, Edinburgh, 10.30 a.m.

June 28.—I.G.E.—Board of Examiners; Oral Examinations, 9.30 a.m.

July 21.—MANCHESTER DISTRICT ASSOCIATION.—Visit to the Higginshaw Gas-Works, Oldham. Paper by Mr. Norman Hudson, Mirfield—"Observations on the Differential Charges of Gas for Distribution Purposes."

Sept. 7.—NORTH BRITISH ASSOCIATION.—Annual Meeting in Paisley.

1933 "JOURNAL" Directory.

Page 64. STEVENAGE. Officials: W. Phillips, General Manager and Secretary; L. F. Garner, Resident Manager.

EDITORIAL NOTES

Making Road Tar

READERS will find much of interest in a paper on later pages dealing with the direct recovery of standard road tars from any type of carbonizing plant. The paper, presented by Mr. F. Cooke at a recent meeting of the Midland Section of the Coke Oven Managers' Association, describes the working of a process which has been developed at the coke oven plant at Wombwell Main Collieries and has been applied in connection with Glover-West continuous vertical retorts at the Rochdale Road and Partington Gas-Works of the Manchester Corporation, and also in connection with the Trefois producers at the Bradford Road Works, Manchester. The idea is to circulate tar through the collecting main and the foul main of either the ovens or the retorts, the heat of the crude gas passing from the ovens or retorts serving to effect dehydration and partial distillation of the tar. Road tar of any desired standard is withdrawn from the foul main at a point at which the temperature of the gas is still above the dew-point of the lighter tar constituents, which pass forward with the gas. "By simple manipulation of this fundamental physical condition of the foul gas stream, road tar may be produced, continuously or intermittently, such road tar being superior in important respects to that produced by dehydration or distillation in stills, and it fulfils in all details the British Standard Specification for Tars Nos. 1, 2, and 3."

During the past few months large-scale research has been carried out at the Partington Works on a bed of eight Glover-West vertical retorts of modern design, each retort having a nominal coal throughput of 5 tons per day and steaming being applied to the extent of 20% of the weight of the charge to produce 19,500 c.ft. of gas of 450 B.Th.U. gross per c.ft. per ton of coal carbonized. From the first experiment at Partington it was apparent that excellent road tar could be produced. No difficulty was experienced in producing from crude tar up to 2300 gallons of road tar per day on one bed, this quantity being equivalent to five times the quantity of crude tar produced per day by one bed of retorts. The author maintains that "it has been proved that road tar can be produced to any desired viscosity which fulfils the British Standard Specifications and is superior as regards specific gravity, free carbon, and tar acid content, to road tar produced by ordinary dehydration in stills from the same crude tar. Moreover, the road tar is recovered in a perfectly dry finished state which renders it unnecessary to install subsidiary dehydration or distillation plant of any kind." Because of the success of the trial, it is intended to go a step further by installing experimental stills for the production of pitch and anthracene oil. Mr. A. L. Holton, Engineer to the Manchester Gas Department, mentions the advantage of tar circulation in avoiding pitched-up mains.

In regard to the application of the process to the Trefois producers at the Bradford Road Works, it has been shown that crude tar can be distilled to road tar or pitch with ease. For several months the plant has operated continuously. The crude tar consists of 85% vertical retort tar and 15% horizontal retort tar, and one producer will make up to 20 tons of road tar per day "at exceedingly low capital cost and without increased labour charges." Mr. Cooke observes that, as a result of adopting the process, the charges for water previously used for cooling and washing the producer gas have been eliminated, and the extremely fine dust has been removed from the gas.

Rationalization and Taxation

ON the occasion of the annual meeting in London last month of Primitiva Holdings, Ltd., the Chairman (Mr. P. Ashley Cooper) gave a timely reminder of the vital importance of research being undertaken and developed in the basic industries of this country, to meet competition, and the adoption of rational methods in the Gas Industry as a whole. In particular he pointed to the improvements achieved by this important Argentine undertaking resulting therefrom. Following as this reminder does the the remarks of Mr. E. Castleton Elliott (President of the Society of Incorporated Accountants and Auditors) and those of the Chairman of Imperial Chemical Industries, Ltd., both of whom referred to the greater significance to be attached to the income-tax allowances in respect of depreciation and obsolescence, consequent upon the changing needs of industry and the necessity for scientific research, it may not be inappropriate to add to the editorial comments in a recent issue of the "JOURNAL" under the heading of "Depreciation Allowances."

Although the Income-Tax Act of 1842 was regarded as authorizing a deduction from profits in respect of the cost of *renewing* industrial plant and machinery, no specific provision was made for the allowance of *depreciation*, and it was not until the year 1876 in the case of *Forder v. Handyside & Co., Ltd.* (35 L.T. 62), in which the Court refused to allow a deduction from profits to compensate for the diminished value of assets employed in carrying on the business of the defendant Company, that it became apparent that some bodies of local Income-Tax Commissioners were disposed to grant an unauthorized allowance. As by this time it had become evident that the income-tax had advanced beyond being a temporary impost, the Customs and Inland Revenue Act, 1878 (sec. 12), empowered the Commissioners throughout the country to grant such allowances. It may well be imagined that this power led to differing opinions as to the appropriate rates of allowances for particular classes of machinery; but this has been overcome to a large extent by traders and manufacturers in various industries combining to negotiate agreements with the Board of Inland Revenue, whereby standard rates are obtainable without recourse to the local Commissioners or (in the event of dissatisfaction) to the Board of Referees. The agreement applicable to gas companies was drawn up in 1912, and while the depreciation allowances therein prescribed are not entirely commensurate with the actual rate of physical depreciation which is inherent in most industrial plant, it must be conceded that industry generally has benefited from the adoption of such agreements. Indeed, the only real criticism—that the annual rate of allowance is insufficient—is largely met by a further allowance (which was actually granted as far back as 1897, but was legally enforceable only since the Act of 1918) when obsolete plant is replaced. Thus when, owing to obsolescence, certain machinery is thrown out of use and is replaced by a more up-to-date machine before the aggregate allowances for depreciation have reduced its original cost to scrap value, the remaining balance may be deducted from the profits for the year in which the replacement took place.

In interpreting this provision of the Taxing Statute, however, the difficulty arises in that, in order to comply with the terms of Rule 7 to cases I. and II. of Schedule D, it is necessary that the machinery shall be obsolete, and that it shall be "replaced." To meet the latter

point, the Royal Commission which reported on the Income-Tax in 1920 recommended that the allowance should be granted where plant or machinery was disused for any reason, *whether replaced or not*, except the discontinuance of the business. The Legislature has not seen fit to adopt this recommendation, which, however necessary in the earlier post-war years, is still more greatly needed in these days, when circumstances make imperative the adoption of new and improved methods of manufacture, as well as the exploration of every avenue whereby economies can be effected and redundant plant discarded —as, for instance, by means of amalgamations, arrangements for joint working, and for the taking of gas in bulk from coke ovens.

In the one case scientific research demands that money shall be expended upon plant which is not immediately—or, perhaps, at all—remunerative and which will be disposed of merely as scrap when the experiments have been concluded; on the other hand, any attempt to merge the interests of undertakings or rationalize their production will result in machinery being discarded which is neither " obsolete " (in the sense that it is worn-out) nor " replaced."

More Elasticity Needed

When, in September, 1931, the Chancellor of the Exchequer announced that increased wear and tear allowances would be granted (to compensate in some measure for the increase in tax burden imposed on trading concerns by the Supplementary Budget), and that, in future, the Board of Inland Revenue would be disposed to take a more liberal view of the conditions under which the obsolescence allowance could be claimed, it was optimistically hoped that the position would be clarified. While it is true that the Finance Act, 1932, provided for an increase of 10% in the *quantum* of income-tax wear and tear allowances, the concession was partly nullified by a proviso that the additional allowance should be taken into account in computing the obsolescence allowance. Confirmation of the latter promise was forthcoming from the Chairman of the Board in December, 1931, when, as an illustration, he cited the circumstances of an electricity undertaking which scrapped generating plant and purchasing bulk supplies of current. Although the original plant was neither worn-out nor replaced by similar plant, a claim for obsolescence would be competent.

Although some undertakings have obtained relief from this alteration in the official view where conditions were somewhat similar to the circumstances cited, it is evident that on the general question of obsolescence and replacement the attitude of the Board of Inland Revenue is by no means strictly defined, and until some amendment of the Income-Tax Act is effected, that uniformity of treatment which is so desirable must be necessarily lacking. That such amendment may be anticipated is unlikely, in view of the fact that a clause, which was moved by a former Chancellor, Sir Robert Horne, when the 1932 Finance Bill was in Committee of the House of Commons last May, and which provided for the substitution of " scrapped " for " obsolete," was unacceptable to the Treasury. At the same time, Major Elliott (then Financial Secretary) declared that the principle underlying the clause was accepted by the Revenue, which was " not concerned to inquire too closely whether the machinery is to be regarded as of a new and improved type as compared with the old." This statement should be of value in negotiating the vexed questions of obsolescence and replacement.

Regarding expenditure on research work, the Board of Inland Revenue submitted to the Committee appointed in 1924 to report on Industry and Trade, a Memorandum (reproduced in the Final Report published in 1929) to the effect that no objection was taken by the Board to a deduction from profits being allowed—provided the expenditure bore a sufficiently definite relation to the earning power of the business, and was not in the nature of a capital expense—in connection with research or contributions (subject to corresponding conditions) made by a trading concern to Research Associations.

In considering the question of depreciation no mention has been made of the position regarding buildings and other assets which are not within the definition " plant or machinery; " for while the gradual deterioration of business premises by reason of natural decay is normally taken into account from a financial point of view, no specific deduction is allowable for income-tax purposes. It is, however, possible to claim an allowance under the 1918 Act in respect of the additional wear and tear caused by vibration in the case of factory and other buildings containing motive machinery; while the Committee on Industry and Trade recommended an allowance on all buildings used for productive industry at the rate of 2½% on the written-down value. The reasons given for the recommendation, which has been supported in the daily Press during recent weeks, were that such an allowance would not only be equitable, " but would make for efficiency by encouraging the more speedy replacement of unsuitable or obsolete buildings."

We can think of no stronger claims than these in favour of still more elasticity in the operation of the taxation rules relating to depreciation and wear and tear. Not only would encouragement be given to trading undertakings to install up-to-date and more efficient plant and machinery, but, in turn, the equipment manufacturers of the country and the heavy industries would be encouraged to expand and develop—a consummation devoutly to be wished.

National Publicity

National publicity, as practised for many years past by the Gas Industry, is all the time gaining fresh adherents in other directions, and the electricians have been feeling the need of themselves doing more than they have hitherto done in this way. Reports now appearing in the Electrical Press indicate that steps are at once to be taken to meet this need, by a complete re-organization of the Electrical Development Association, accompanied by reinforcement " with adequate funds for a big autumn campaign." It seems that the question of funds for national publicity work has been receiving the attention of the Central Electricity Board, and ultimately a conference took place between members of the Board and the General Purposes Committee of the Electrical Development Association. At that conference Sir Andrew Duncan, on behalf of the Board, " outlined proposals which, it was believed, would lead to a large increase in the financial resources of the Association, and thus enable it to carry out its functions more successfully."

It is gathered that the proposal is to re-constitute the Association, under its present title, but so that membership shall consist solely of authorized electricity supply undertakings—the qualification for membership (including that of the Central Electricity Board) to be an annual contribution on such assessment as may be determined by the Council from time to time. Until decided otherwise, the idea is that the present basis of assessment shall be continued. The belief is " that re-organization of the Association on the lines suggested can alone create the enthusiasm and provide the funds which are essential to give the hoped-for impetus to development." In all probability we shall not have to wait very long for evidence of the effect of the contemplated changes. The matter is referred to here in order that there may be no possible doubt as to the Gas Industry being fully prepared to meet this intensified campaign, which is timed to coincide, broadly, with the completion of the National Grid.

PERSONAL

B.I.F. DIRECTOR HONOURED.

Exhibitors at the British Industries Fair will be gratified to learn that the King has conferred the decoration of C.V.O. upon Mr. Claude Taylor, O.B.E., Director of the Fair.

Mr. Taylor has been associated with the Fair from its inception in 1915, first as Secretary, then, since 1932, as Director; and his knowledge of British exhibitors and exhibits, extending back to the big international exhibitions of pre-war days, is probably unique. Every exhibitor at the B.I.F. knows Mr. Taylor, and very many of them have had reason to be grateful to him for his swift and courteous attention to any difficulty brought to his notice; while with the general public he is a familiar figure as the Queen's cicerone during her yearly visits to Olympia and the White City.

MR. CLAUDE TAYLOR.

* * *

TRIBUTES TO MR. JAMES MITCHELL.

The great esteem in which Mr. James Mitchell, Nelson's Gas Engineer and Manager, is held by the staff and employees, and the sorrow that is felt at parting with him, were manifest at a social gathering of all the employees in the Gas Department on June 7, when Mr. Mitchell was presented with an inscribed gold wristlet watch.

Mr. L. B. Chapman, the Deputy Engineer, presided, and among those present were the Mayor (Alderman R. J. Husband), Councillor King (Chairman of the Gas Committee), Alderman C. Smithson, and Mr. G. R. Macfarlane, who succeeds Mr. Mitchell as Manager at Nelson.

The gift was presented to Mr. Mitchell, on behalf of the staff and employees, by Mr. H. Brown, the Chief Clerk, who spoke of the happiness that had characterized Mr. Mitchell's association with the Department from the beginning of his régime. Mr. Brown stated that Mr. Mitchell's service of fourteen years as Engineer was not quite a record, but the late Mr. Foster was the only person to have occupied the position for a longer period. There could be no two opinions about the capabilities of Mr. Mitchell in his management of the Department.

Handing over the watch to Mr. Mitchell, Mr. Brown said, "You have shown us how to make work as pleasurable as it can be, and we only wish you could have stayed with us longer; but the City of Leicester has held out to you much more than Nelson can, and we trust that you will be happy in your new sphere of work."

Councillor King spoke in eulogistic terms of Mr. Mitchell, and the Mayor added his testimony to the sterling qualities of the Manager as an individual and also as Engineer of the Nelson Undertaking. He stated that during his period as Mayor he had come into contact with all the officials, and he had the very highest regard for Mr. Mitchell so far as his personality was concerned and his understanding and management of his Department. An official in whom they could have confidence was one who administered his Department with care and zeal; and he could assure them that all the members of the Council had had the utmost confidence in Mr. Mitchell during the whole of his service with the Corporation.

The Mayor also presented Mr. Mitchell with a box of cigarettes as a personal token of his esteem for him.

In the course of his response, Mr. Mitchell said that it was difficult to find words to express his thanks for the generous expression of esteem which had been shown to him. It bore out in no mistakable manner the expressions which had been shown to him during his years as Engineer in the charge of the Gas Undertaking; and he would have been amply satisfied if they had given him their good wishes. He could assure them that the watch would always remind him of the happy times he had had with them. He concluded by wishing every success to Mr. Macfarlane.

A welcome to Mr. Macfarlane was also extended by Councillor King.

Mr. Macfarlane said it was seven years since he left Nelson, and he hoped his association with them in the future would be a long one, and as happy as the four years he had spent previously with the Department had been.

Mr. Mitchell took up his new duties at Leicester last Monday.

* * *

Our readers will be sorry to learn that it has been necessary for Mr. W. E. Price, Hon. Secretary of the Institution of Gas Engineers, to undergo an operation for appendicitis, and they will join with us in wishing him a speedy recovery to good health.

* * *

Messrs. Peebles & Co., Ltd., have appointed Mr. S. J. Sewell, Nithsdale House, 11, Barrington Road, London, S.W. 9, as their Representative for London and the South of England.

CORRESPONDENCE

Purifier Dimensions and Capacities.

Sir,—May I pay my ardent tribute to Mr. George Evetts, who presented a most interesting paper on "The Centralized Manufacture and Distribution of Gas in Belgium" at the Liverpool Meeting of the Institution of Gas Engineers. It contains a great deal of information on plant design which will be most valuable to Gas Engineers and Coke Oven Managers who contemplate the installation of the type of plant erected at Pont Brûlé. Among the different aspects dealt with in the paper, the oxide purifiers show certain features which seem worthy of a closer study: (1) Deep boxes have been adopted in accordance with Continental practice in order to save ground space. (2) Each box contains several layers of oxide through which the gas passes in parallel in order to reduce back pressure. (3) The capacity of the installation is about one-third of that required according to English practice.

Attention was drawn to the latter point by Mr. Clegg in the course of the discussion. Unfortunately, purifier dimensions are often arrived at on an entirely arbitrary basis, ignoring the fundamental principles of the processes involved and operating conditions. It is now generally accepted that the capacity and the economy of an oxide purifying plant depend on the volume of oxide contained in it, but too little attention is paid to the factors determining the optimum size. These are mainly: The concentration of the hydrogen sulphide in the gas and the active iron content of the oxide. It has been established by C. G. Millbourne and others that the volumetric capacity of purifying (content of purifying material) is a function of the second root of the hydrogen sulphide concentration in the gas, whereas it is indirectly proportional to the active iron content in the oxide, since the rate of reaction is directly proportional to the concentration of active material. The concentration of active iron per unit volume of oxide, therefore, exerts a much more powerful influence on the dimensions and hence the capacity of purifying plant than the concentration of the hydrogen sulphide in the gas. The active iron varies considerably between dif-

ferent purifying materials, so that this factor should be taken into account in the design of purifying plant, whose size and cost is so vitally affected by it. Mr. C. G. Pearson, in his paper on "Notes on Purification" read before the Institution of Gas Engineers in 1929, states that "6·6 c.ft. of oxide per 1000 c.ft. of gas should be available in the case of active oxide, but that 7·7 c.ft. of oxide per 1000 c.ft. of gas should be provided in the case of ordinary oxide." This allowance seems hardly adequate in view of the wide difference between the active iron content of purifying materials, which varies from 10 to 30% in even so-called high-class products. The oxide content of a purifying plant should therefore vary 300% (10 to 30) instead of 17% (6·6 to 7·7). It would seem that the purifying material is chiefly responsible for the relatively small size of the plant at Ponte Brûlé, since the oxide used in this installation is stated to be "pure Lux," a product of acknowledged highest activity and capacity. It is significant that Belgium engineers, like their colleagues in Holland, prefer an artificial and imported product to the natural ores found, so to speak, on their doorsteps; but obviously the saving in capital and operating costs resulting from its use more than outweighs the higher purchase price of the artificial material over the natural product.

Yours, &c.,
JAMES H. DUXBURY.

Thos. Duxbury & Co.,
Palace Chambers.
Westminster, S.W. 1,
June 12, 1933.

Construction of a 3-Million Spirally-Guided Gasholder

SIR,—I observe that Mr. Gadd still affirms that his equations for axle pressures are correct, and that he considers Mr. Hobson should engage independent authority to arbitrate on the validity of the formula. It is Mr. Gadd who should obtain independent arbitration to ascertain whether his formula is correct if he is not satisfied with the criticisms he has received from various sources. It is scarcely to be expected that contributors to the Technical Press who cannot agree with Mr. Gadd's erroneous equations should go to the trouble of obtaining further proof of the obvious mistakes contained therein. If Mr. Gadd still considers his articles correct, then he should not have difficulty in finding an authority to champion his cause.

When considering the question of stress distribution in complicated structures, the opinions of engineers may differ as to the method or principle used in estimating the quantities, but in the present instance the principle on which the axle pressures are calculated has not been questioned; it is Mr. Gadd's error in the simple mathematical deduction that has been exposed. A fault of this nature therefore cannot be excused or hidden under the cloak of opinion, and it must be regarded purely as a mistake.

I have not overlooked that zero values can be applied to certain algebraic problems only, but the expression illustrated by the formula for momental resistance of roller axles of spiral holders happens to be one to which equality to zero test may be applied. Equations and formula dealing with riveted joints, hydraulics, &c., cannot, of course, be equated to zero indiscriminately. For instance, Mr. Gadd's first example relating to riveted joint efficiency $\frac{P-D}{P}$ indicates that he has lost sight of the fact that the validity of this expression is subject to a restriction—*i.e.*, that $D \leq P$.

If Mr. Gadd writes $P = 0$, this obviously leaves $D > P$ and the validity of the expression is at once destroyed. Now the moment of resistance to overturning of a spiral holder according to Mr. Gadd was $\frac{aD(N+4)}{8}$. Of this the fraction $\frac{N+4}{8}$ is in question, but I note from Mr. Gadd's last letter that he has now found it necessary to change the sign, so that the expression reads $\frac{N-4}{8}$. He then contrives to equate the whole expression to zero by writing $N = 4$. Allowing the irregularity of changing the sign in this expression to pass for the moment, Mr. Gadd is still unable to substantiate the expression, as the sum of the squares of the cosines employed does not vanish as he states, but = 2.

Finally, even if Mr. Gadd's suppositions were correct, the result of $\frac{N-4}{8} = 0$ when $N = 4$, indicates that no resistance is offered to overturning of the floating holder when it is fitted with four guides all equally spaced, but it is certain that a small inflated holder having four guide rails in contact with the rollers would be in equilibrium about any axis, and resistances would be obtained on at least two guide rails.

Yours, &c.,
S. M. MILBOURNE.

31, *Warren Road. Cricklewood,*
London, N.W. 2,
June 12, 1933.

[This correspondence must now be regarded as closed.—Ed. "G.J."]

THE NEWS OF THE WEEK

North Berwick Town Council has reduced the price of gas from 5s. to 4s. 9½d. per 1000 c.ft.

The Merit Medal of the National Canine Defence League was presented by the Mayor of Blackpool to Mr. John Sugden, a member of the staff of the Blackpool Gas-Works, for saving a dog's life by entering the sea at South Shore and bringing the dog to safety.

Price Reduction in Scotland.—The Denny and Dunipace Town Council have reduced the price of gas by 2½d. per 1000 c.ft. Arbroath Town Council have decided to reduce the price of gas from 2s. 10d. to 2s. 6d. per 1000 c.ft. for ordinary meters and from 3s. 2d. to 2s. 10d. for slot meters.

A Travelling Showroom has been brought into service by the Birmingham Gas Department, to supplement the resources of their nine permanent showrooms. It is in the form of a caravan, the size of an average pantechnicon, with telescopic sides, which, when it is on a "pitch," extend the floor area to about 20 ft. square. There is accommodation for a large selection of cookers, gas fires, and water-heating appliances, many of which are available for practical demonstrations. The touring showroom should be the means of doing effective propaganda work in the new residential districts.

South-Eastern Gas Corporation.

Rochester and Gillingham Accept Offer.

The South-Eastern Gas Corporation announces that, as a result of the offers made to the stockholders of the Rochester, Chatham, and Gillingham Gas Company and the Sittingbourne District Gas Company, acceptances have already been received in excess of the minimum quantities required, and that the offers have therefore become effective.

Efficient Lighting at Low Cost.

"To consider street lighting quotations" was one of the items on the agenda at the last monthly meeting of the Chatteris Urban District Council. Tenders had been invited from both the Chatteris Gas and Coke Company, Ltd., and the B.C.H. Electricity Company, Ltd., and there was a difference of about £100 between the two. The Gas Company's tender was unanimously accepted.

The Electricity Company quoted 102 lamps from Sept. 1 to April 30 at £434 19s., this being £4 9s. per lamp, with

THE NEWS—continued.

two special lamps at £7 11s. and £5 12s. A reduction of 5s. per lamp for over 30 lamps reduced the figure from £460. They stipulated a seven-year contract.

The Chatteris Gas and Coke Company quoted 102 lamps for the same period (24 lamps only to be lighted during three nights in each full-moon period) at £321 6s. (as last season) and £336 6s. for the whole of the lighting season, ignoring full-moon periods.

Mr. E. E. Gautrey proposed that the Gas Company's latter tender be accepted, and Mr. W. E. Seaton seconded. "Some of us who have seen the lighting at March are not at all satisfied," said Mr. Seaton. "From what I have seen of some of the electric street lighting it is not at all to be compared with the Chatteris Gas and Coke Company's lighting," was the comment of the Chairman (Mr. A. S. Rickwood).

Cumberland and Westmorland Gas Managers' Association.

Mr. J. Corrigan (Penrith) presided over a meeting of this Association recently held at Grange-over-Sands.

Discussions took place on Sales Staff Meetings, Gasholder Inspection, &c., the members afterwards being entertained at tea through the courtesy of the Chairman and Directors of the Grange-over-Sands Gas Company.

Mr. A. F. Young (Cockermouth) was elected President for the ensuing year, and Mr. J. L. Denham (Whitehaven) was elected Vice-President.

Mr. F. G. Bowness (Maryport) was re-elected Hon. Secretary.

Gas Exhibition at Swindon

Cookery demonstrations twice daily for a fortnight were a special feature of a Gas Exhibition just concluded at Swindon. One of our illustrations shows a lady visitor locking a chain around the door of a Richmond "Regulo"-controlled "Bungalow" "New World" oven which contained a complete meal—joint, vegetables, and sweets. At the end of the cooking period the same lady unlocked the oven, and the meal was withdrawn with every dish cooked to perfection. This was part of the procedure which went on day after day with never a failure.

Having once seen this, housewives are never quite happy until they themselves possess a "New World" cooker which will do the same for them in their own homes. A cake baking competition attracted 36 entries and made judging no easy task. Three prizes were awarded. The sales resulting from the exhibition were most gratifying, and the Swindon United Gas Company will continue to feel the good effects for some time to come. On an average 100 persons attended daily and took considerable interest not only in the demonstrations but in the comprehensive display of gas water heating appliances, which were shown fitted and in action. Part of this section is shown in the other of our two photographs, and includes Richmonds "Newlyn," "Lynton," "Lynstor," and "Equator" heaters.

Manchester Association.

Arrangements have been made for the Manchester District Association of Gas Engineers to visit the works of their President, Mr. G. Dixon, at Nottingham, on Friday, June 23.

Inspection of the gas-works will take place from 12.30 p.m. to 1.30 p.m., following which luncheon will be served at the Council House. During the afternoon the visitors will be able to see the gas-fired central heating system at the Council House, and will then leave for Wollaton Hall, where tea will be taken.

Pulverized Fuel—The Grid Burner.

As a result of investigations into the use of pulverized fuel directed towards the burning of the fuel in the relatively small combustion spaces available in Lancashire and marine type boilers, the Department of Scientific and Industrial Research has issued a report (Fuel Research Technical Paper No. 36; published H.M. Stationery Office; price 6d. net) describing the design and performance of a new "grid" burner developed at the Fuel Research Station.

According to the report, the new burner is cheap to construct, simple in operation, and, as far as can be judged from experience with experimental plant, reliable and easy to operate. The data contained in the report of tests carried out in an open combustion chamber in a Babcock & Wilcox boiler and in a Lancashire boiler bring out the adaptability of the boiler to varying loads and to variations in the type of coal used. The latter ranged from one containing 34% volatile matter to one with only 21% volatile matter.

Results of Rotherham's Two-Part Tariff.

The following summary of a six months' test on the two-part system of charging for gas at Rotherham has been sent to us by Mr. J. T. Haynes, Engineer and Manager to the Rotherham Gas Department, and is sure to interest our readers:

Corporation Houses.

[10 houses with complete gas equipment]

Total consumption six months last year	58,000 c.ft.
,, ,, ,, ,, this year	809,000 ,,
Total gas revenue six months last year	£9 14s. 0d.
,, ,, ,, ,, this year	£52 3s. 3d.
Average price of gas last year	3s. 4d. per 1000 c.ft.
Average price (including service charge) this year	1s. 3½d. per 1000 c.ft.
Domestic saving by using gas instead of coal, average per house	£1 15s. 5d.

Non-Corporation Houses.

[23 houses using existing appliances.]

Total consumption six months last year	284,000 c.ft.
,, ,, ,, ,, this year	703,000 ,,
Total gas revenue six months last year	£46 12s. 4d.
,, ,, ,, ,, this year	£55 19s. 2d.
Average price of gas last year	3s. 3½d. per 1000 c.ft.
Average price (including service charge) this year	1s. 7d. per 1000 c.ft.

No record of coal displaced.

The above are not a selected few, but are all the houses first included for test purposes. The total number of consumers now on two-part tariff is 130.

A "Mr. Therm" Painting Competition.

Advantage has quickly been taken by the Watford and St. Albans Gas Company of the possibilities in the recent advertising scheme featuring "Mr. Therm." A competition for children has been organized, and 10,000 folders are being distributed in the district, in response to applications from various schools. Competitors are divided into two classes—one for those under ten years of age, and one for those between ten and fifteen—and are asked to choose three of the "Mr. Therm" designs given on one of the pages of the leaflet, and to draw and paint them on the blank facing page.

The prizes offered in each class are: First prize, £3; second prize, £1; third prize, 10s.; and 22 prizes of 5s., so that in all there are fifty prizes, making a total of £20. Special forward and return envelopes are provided for competitors to use in sending in their efforts.

To make the competition known, 50 posters and four 9-in. double-column advertisements in the local Press have been prepared. The whole of this advertising scheme was designed by the B.C.G.A. at the request of the Watford and St. Albans Gas Company.

THE JUNIOR VICE-PRESIDENT, I.G.E.

Col. WILLIAM M. CARR, T.D.

Col. Carr was born in the year 1886, and was educated at Manchester University, Owens College, where he took the Engineering Certificate. He was afterwards pupil under the late Lt.-Col. J. Mitchell Moncrieff, C.B.E., Civil Engineer, of Newcastle-on-Tyne, and was engaged in bridge and dock construction work. He spent a year subsequently in Germany on gas-works and engineering works. In 1907 he joined his father, the late Mr. Isaac Carr, M.Inst.C.E., in his gas and water consulting engineering practice, and assisted in the design and construction of a number of new gas-works, including Thornton, Cleveleys, Frizington, Withnell, and Fazakerley for the Liverpool Corporation, and in practice generally. In 1911, in addition to consulting work, Col. Carr became Engineer and Manager to the Ormskirk District Gas Company, and in 1922 Engineer and General Manager to the Stretford and District Gas Board. He has served for twenty years in the Territorial Army in the 55th West Lancs. Divisional Royal Engineers, being with this unit in France during the war. He also served throughout the North Russian campaign. At the present time he commands the unit. He received the rank of Brevet-Colonel in 1930, and was awarded the Territorial Decoration in 1929.

Waverley Association.

The Waverley Association of Gas Managers are holding their Annual Meeting in the Goold Hall, St. Andrew Square, Edinburgh, on Friday, June 23, when the President, Mr. George Braidwood, of Coatbridge, will take the chair at 10.30 a.m., and deliver an address which will be open to discussion. The meeting will adjourn for luncheon at 1.15 p.m. in the North British Station Hotel.

The Golf Competition will be held on the afternoon of Thursday, June 22, commencing at 1.30 p.m.

Chesterfield's Reduced Charges.

The Chesterfield Corporation Gas Committee recently considered a joint report presented by the Gas Engineer and the Borough Treasurer with reference to the application of the present scale of gas charges to large consumers. Finally, it was agreed that the following recommendations contained in the report take effect as from July 1 next:

First 10 therms per quarter, 10d. per therm; next 40 therms per quarter, 8d. per therm; next 50 therms per quarter, 7d. per therm; next 400 therms per quarter, 6d. per therm; over 500 therms per quarter, 5d. per therm; less 5% for cash discounts. For the Corporation gas supplied outside the Borough, 1d. per therm to be added to the above charges.

The present charge per therm in respect of prepayment meter charges will cease to operate beyond a consumption of 20 therms per quarter.

A New Crucible Furnace

Further Aid to Industrial Gas Sales.

The "Efficiency" gas-fired natural-draught crucible furnace, pro. pat. No. 5997/33, has been designed to replace the coke-fired pit furnace. This furnace uses gas at ordinary town pressure and only requires a flue about 16 to 20 ft. high, 5 in. in diameter, to assist in inducing the air. A very high flame temperature is obtained by pre-heating the air with the waste heat of the exhaust gases. This increases the efficiency of the furnace and makes it possible to obtain very high casting temperatures. The gas burner is remarkably silent when in use, and its simple construction ensures freedom from trouble.

Construction.

The furnace consists of a heavy cast-iron casing lined with suitable insulation material (shown dotted in fig. 1). An inner lining built of refractory material of the best quality forms the chamber of the furnace in which the crucible is placed. The air is pre-heated by external and internal recuperators. Thus much of the heat which would otherwise pass up the flue is returned. The crucible C is supported on a small raised stand, and, if it cracks and allows the metal to run into the furnace, a fusible seal, S, is melted and the metal drains off, no interference resulting to the supply or combustion of the gas.

Method of Working.

Referring to fig. 1, gas issues through the nozzle G and induces the air with it in the induction tube B. The gas and air enter the main chamber of the furnace tangentially and burn while the mixture swirls round the crucible C, before passing out through the exhaust port P into the exhaust flue E. The hot exhaust gases then travel round the exhaust flue E and heat the air in the flue A through the refractory wall F. They then pass into the external metal recuperator (not shown) and give up still more of their heat to the incoming air before passing up the flue. This air is thus heated before it enters the flue A, in which

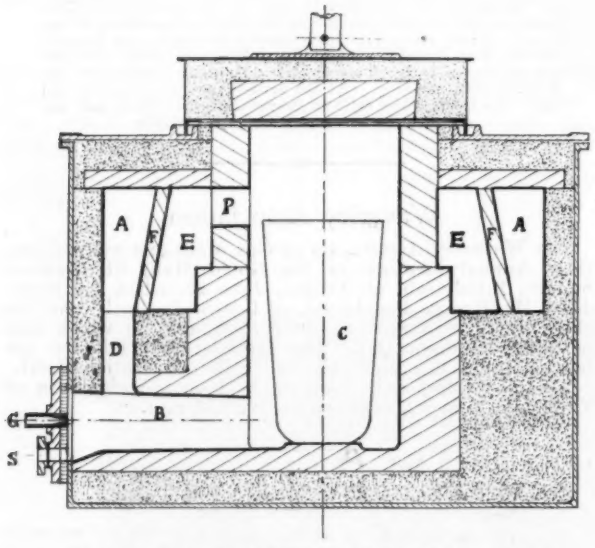


Fig. 1.—Cross-Section of "Efficiency" Crucible Furnace.

it is heated still further before it passes *via* the downtake D to the induction tube B. Since the gas and air are not mixed before they are lighted, a much softer flame is obtained which does not cut the crucible or lining, as is often the case with gas-fired or oil-fired crucible furnaces. Thus a longer life is obtained from the crucibles than is usual for this class of furnace. The makers (Thomas Ashworth & Co., Ltd., Burnley) also claim that the maintenance costs are extremely low, as the best types of refractories are used and there are no metal parts within the main casing of the furnace.

The advantages claimed by the makers are as follows

1. No blower or compressor is required.
2. Absolute cleanliness and improved conditions for the workmen.
3. No flame cutting action on crucible.
4. Low metal losses due to non-oxidizing atmosphere.
5. Quick melting.
6. Reduced labour costs (can be operated by unskilled labour).
7. Low first cost.
8. Low maintenance costs.
9. Small floor space required, about 3 ft. by 3 ft. 6 in.
10. Remarkably quiet running and extremely reliable.

Fig. 2.—The "Efficiency" Crucible Furnace.

Tests on "Efficiency" Crucible Furnace.

March 13, 1933—*Test on Aluminium, starting from cold.*

Total gas used	2126 c.ft.
Total aluminium charged	262½ lbs.
Gas used per lb. of aluminium charged	8·41 c.ft.
Gas consumption per hour	240 c.ft.
Total time furnace was lighted	8 hrs. 50 mins.
Metallic loss	9¾ lbs. = 3·71%
Calorific value of gas	500 B.Th.U. gross
Average casting temperature	730° C.

March 14. 1933—*Test on Aluminium, Furnace warm from previous day's melt.*

Total gas used	2515 c.ft.
Total aluminium charged	339¾ lbs.
Gas used per lb. of aluminium charged	7·4 c.ft.
Gas consumption per hour	293 c.ft.
Total time furnace was lighted	8 hrs 35 mins.
Metallic loss	1½ lbs. = 0·441%
Calorific value of gas	500 B.Th.U. gross
Average casting temperature	687·5° C.

Test on "Efficiency" Crucible Furnace—Brass Melting.

May 2, 1933—*Furnace started up warm from previous day's melt.*

Total gas used	1795 c.ft.
Total brass charged	409½ lbs. in 5 melts
Gas used per lb. of metal charged	4·38 c.ft.
Gas consumption per hour	229 c.ft.
Total time furnace was lighted	7 hrs. 50 mins.
Calorific value of gas	500 B.Th.U. gross
Average casting temperature	1008° C.

MECHANIZATION IN . . GAS OFFICES . .

The "Punched Card" System

By C. Ralph Curtis, B.Sc. (Econ.).

The past ten or fifteen years have seen an amazing increase in the introduction of new and improved machinery in every branch of our industrial life.

The vast majority of this machinery having been directed towards the improvement of the production of commodities, one's attention has been drawn to a certain extent away from the equally amazing strides which have been made in the introduction of machinery in the office.

It is impossible, in an article of this length, to deal with more than one aspect of this movement, and my purpose is to describe here some of the applications which have been found for the so-called "punched card system" in the offices of some of the larger gas companies. The principle involved in the punched card system is fairly simple. The basic factor is the card (see fig. 1), which is divided into forty-five columns horizontally, each column being numbered one to nine and zero, vertically. The card is divided up into fields in accordance with the information which it is required to register.

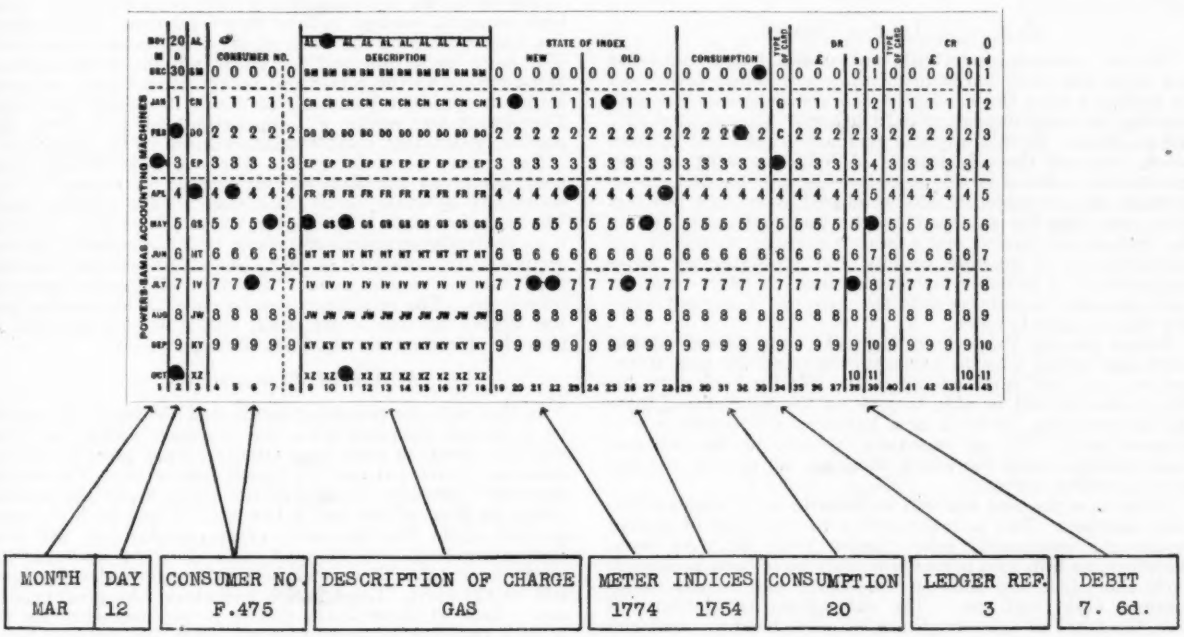


FIG. 1.

Thus, in the example shown, the columns are, date, consumer's number, description of charge, meter readings old and new, consumption, ledger reference number, sterling debit, and sterling credit. The installation consists of a number of punches, depending on the number of cards to be punched, a sorter, and a tabulator. The sorter can take the cards and sort them out mechanically into numerical order under any of the forty-five columns on the card. Thus, if the sorter is set to sort out under column three—consumers' number—it will sort all the cards into numerical order of customers, placing all carrying the same number together. This sorting is carried out at a speed of 24,000 per hour. Once the cards have been sorted out in the right order, they are placed on the tabulator which will take the information contained on the cards and print it on to whatever forms are fed into it. In the case with which we are dealing, the cards are primarily used for billing, but once the bills have been completed it must not be forgotten that the same cards can be used over and over again for any sort of statistical analysis of sales, consumption, costs, cash, &c., which may be required.

The cards relating to standing charges such as meter rent, hire of stoves, hire purchases, &c., can be prepared once and for all, and used over and over again.

Column four, the description of charges, requires a little further explanation. It is now possible to incorporate a printing mechanism into the tabulator, and in the example given it is possible to print a description up to ten letters. It will be observed that the letters on the card are in pairs. If the first of the two letters is required as for the G in gas, then that hole only is punched, but if the second is required as in S, then the G hole is punched and the Z in the same column. The machine does the rest.

We will presume, therefore, that the cards relating to the standing charges have been punched in advance, that new cards have been punched from the inspector's meter book in respect of all consumption, and that cards in respect of other forms of charge such as coke supplied, or work done, have similarly been prepared.

All the cards are then placed, mixed up as they are, into the sorter and sorted out in clients' account number. Once sorted they are then put into the tabulator, into which are fed the bill forms in continuous rolls or packets. The tabulator will register all the information in respect of each client's number on to one bill form and will then stop and take and print a total, after which the tabulator will feed the bill form up a number of spaces automatically in order to place the next form in a position for the information awaiting it from the next set of cards.

A glance at the bill form (fig. 2) will show that the data is not necessarily printed in the same sequence as that in which it is punched. By an arrangement on the tabulator it is indeed possible to change the data around in the transmission so that in the case given, column four prints before any other column. Furthermore, it is also possible to arrange for the tabulator to print the data from any column in more than one place. Thus in fig. 2, the last two columns are printed twice, once on the bill form proper and once on the cashier's counterfoil attached thereto. This latter is, of course, detached by the cashier when the money is received.

Once having sent out the bills, there is no reason why these same cards should not be used for ledger posting

THE BRITISH SUPPLY COMPANY, LTD.

DATE

F. S. CLARENDON, ESQ.,
44, PARK AVENUE,
MORDEN.

F. 475

Head Office: 90, HIGH STREET.
Branches: 1/3, MAIN AVENUE.
127, LONDON ROAD.

Office Hours: 9–5.30; SATURDAY 9–1.

Telephone: 2237 (3 lines)

DATE:
CASHIER'S COUNTERFOIL.
PLEASE DO NOT DETACH

F. S. CLARENDON, ESQ.,
44, PARK AVENUE,
MORDEN.

F 475

Description of Charge.	Date.	Meter Indices. Present.	Meter Indices. Previous	Consumption. Hundreds Cubic Feet.	Consumption. Rate.	Debit Net Amount Payable.	Credit.	Ledger Ref.	Debit. Net Amount Payable.	Credit.
		Hundreds Cubic Feet				£ s. d.	£ s. d.		£ s. d.	£ s. d.
Gas	March 12	1774	1754	20	9d.	0 7 6		3	0 7 6	
Meter					per	0 1 9		6	0 1 9	
Geyser						0 2 6		4	0 2 6	
Sundries					therm	0 11 6		5	0 11 6	
						x£1 3 3			x£1 3 3	

FIG. 2.

purposes. In many of the most up-to-date firms, customers' ledger accounts are not kept any longer, the sales being on a monthly cash basis. A copy of the bill is considered sufficient.

Mechanical Ledger Posting.

Where, however, individual customer's ledger accounts are kept, the same cards in customers' number order can be replaced onto the tabulator and the ledger cards—presuming the employment of card ledgers in trays—fed into the machine. In this way the personal ledgers can be compiled. One of the advantages of ledger posting by any mechanical method is the fact that the new balance on an account can be automatically produced after each posting. This, too, can be produced on the punched card. When the entries are passed and a new balance is struck by the tabulator, it is possible to link the tabulator up automatically to a punch which will punch balance cards for each account, containing only the customer's account number and the new balance.

Before posting the ledgers the next time, these balance cards are sorted into the cards representing the new transactions, and will come on top of the pile for each account. The tabulator will be able to pick up the old balance, pass the new entries, strike a new balance, and punch a new balance card. By an ingenious device, in the sorting, those balance cards for which there are no new entries are automatically ejected.

Columns eight and ten will be seen to be a ledger reference number. This number refers to the type of charge made—gas consumed, coke, meter rent, &c. As soon, therefore, as bills and personal ledgers have been produced, back the cards are sent to the sorter and sorted under columns eight and ten. The subsequent tabulation will give the total of sales made under each heading, and can serve either as sales day books, or sale journals, or alternatively on card ledger forms, as the different sales ledger accounts in the general ledger.

It will have been observed that the name and address of the customer have been typed in on the bills. It is, however, possible to avoid this, if the printing field on the card is extended to, say, twenty letters. This could be done in the example given by suppressing the meter readings and leaving the consumption only. Name and address cards can then be punched in advance and kept for permanent use (until in fact they wear out by constant passing through the sorter and tabulator). If the name and address is to be printed in three lines, as in fig. 2, then three cards must be punched, one for the name, one for the street and number, and one for the town, each card containing only this information in addition to the customer's number. The name and address will then appear as follows:

A 532	Mr. H. Smithers,
A 532	16, Park Avenue,
A 532	Mordon.

Date.	Consumer's Number.	Description of Charges.
April 16	A 532	Gas

with that part of the bill referring to the customer's number and the description of the charge directly below the customer's number and name and address on the heading. This, of course, would involve a re-arrangement of the order in which the items appear on the bill, and of the place in which the name and address appear, the latter moving presumably over to the left of the bill heading.

The foregoing description will have been enough to show how many diversified sets of figures, forms, and analyses can be provided on the basis of the original one card which will have been punched for each individual transaction. With regard to the punching, inexperienced girls can soon attain a speed of punching of about 300 cards per hour. The tabulator works at approximately 120 cards per minute, depending upon the information to be tabulated.

There may be some readers who will have thought that they perceived the flaw in this system in respect to the possibility of error in the punching of the original card. This is, of course, a serious matter. Once the card has been correctly punched, the whole of the remaining figures, analyses, &c., must be correct, but an incorrectly punched card will, of course, render incorrect all figures compiled therefrom. The punchings can be checked by another person before the cards are used, but it is now possible to provide an automatic check on these punchings.

Automatic Punching Check.

In this case the punching media and the cards are passed to a second operator who has a punch which has been slightly offset so that any circular holes already on the card are converted on this punch into ovals. The second operator therefore repunches the cards from the posting media in front of her and if her reading has been the same as that of the first operator, every circular hole will have been converted into an oval, and if either operator has made a mistake there will be one or more circular holes left on the card. Good punch operators, like good typists, never look at their work, and it is not necessary for the second operator to scrutinize all cards for circular holes. Instead, the cards are placed in a machine which will run through them and will automatically throw a red card in at every place where there is a card with a circular hole in it.

In this way you will see that the system is nearly as foolproof as possible.

Costing System.

One of the essentials in any large works where industrial processes are being carried on is an adequate costing system.

Here again the punched card can be used. Where a variety of jobs is being done, job cards for each workman can be established, giving job number, workman's number, hours, rate, total, &c. Where material is issued from the store for a job, a card can be used differing from the man's except that the job number and cost columns will be in the same place. A tabulation of both cards together will give the cost of each job, and a tabulation of the man's job cards will produce the man's weekly earnings. From these latter tabulation weekly wages cards can be punched for each man giving details of hours worked, gross earnings, deductions, and net wages, from a tabulation of which the pay roll can be compiled.

In many cases these weekly wages cards are put to a double purpose, having spaces on the back for use as a time card so that a man can clock in and out in these spaces during the week and have his net wages calculated on the other side at the end of the week. There is thus a check

on the number of hours worked, as the figures in the hours column on the face of the card must agree with the number of hours clocked in on the back.

I would emphasize that I have only been able to describe a very small part of the possibilities which are presented by this system. It is possible, for example, to have eighty or ninety column cards where more data are required, and for firms where the variety of data is small, a twenty-six column card can be used with an installation which is correspondingly much smaller than the ordinary one, and which costs both in capital outlay and running costs correspondingly less.

The punched card is, of course, only one of the many examples of the extent to which office machinery has been perfected during the last decade, and which space prevents me from describing further here.

Gas-Works Fuels for Omnibus Engines

In the course of the 23rd Annual Congress of the Tramways, Light Railways, and Transport Association, held in Leeds on June 8 and 9, a paper was presented on the subject of alternative fuels for omnibus engines, by Mr. D. E. Bell, the General Manager of the Yorkshire (Woollen District) Electric Tramways, Ltd., who made references to the use of creosote oil and compressed coal gas. Some further information concerning the progress made in these fields was also given in the course of the discussion.

Many types of fuels were discussed in the paper. Creosote oil and coal gas come within the category of fuels which are not used in petrol engines of orthodox design, but which call for special carburetting or gas-mixing devices.

The field of compressed coal gas was promising, and much good work, and partially successful work, had been done. The use of gas at high pressures had become a practical proposition, due to the development of light storage cylinders of suitable steel. At present coal gas used under these conditions cost, on the basis of heat units, about 40 to 50% less than petrol; and more than half the price of the gas was due to the cost of compression. So far the range of operation of a vehicle with one fill of gas was between 70 and 80 miles—a limited range when compared with that of the modern petrol 'bus.

There were still, he said, a number of minor difficulties to be solved before compressed coal gas could become a practical fuel for omnibus operation. There was also the question of the difficulty of obtaining universal supplies.

Reports on the results obtained from the use of gas in omnibus engines suggested that there was a loss of power as compared with petrol, which became marked when the engine was fully loaded. For experimental purposes, it was advisable, therefore, to choose a vehicle fitted with an engine having a fair margin of power.

Coming to the direct use of specially refined creosote oil—another promising development—he said the special equipment involved in adapting the engine to use this fuel included an auxiliary tank for petrol starting, an additional carburetter, and a special induction manifold. This would cost approximately £40, while the fuel could be obtained for about 6d. per gallon. The main difficulty so far encountered was to obtain uniformity in creosote oil supplies. Tar acids content was found to vary considerably; in some mixtures it was as high as 20%, and in others from 5 to 7½% only.

The use of creosote for commercial vehicles had passed from the experimental stage, and to his knowledge a number of vehicles using it were in regular use. As in the case of coal gas, improved results had been obtained by increasing the engine compression ratio. From operating experiments it was found that in the more modern type of engine the power output was comparable with that obtained from petrol throughout the speed range. With the older types of engines, however, there was a definite falling-off of power when the engine speed fell below 700 r.p.m.

One range of experiments on an omnibus had shown that it was desirable to arrange the equipment so that the petrol carburetter was used for speeds up to 400 r.p.m. before throwing over to creosote.

This was an attempt to cure the nuisance caused by excessive exhaust smoke at low speeds—or, rather, when the engine was decelerated. This excessive smoking was most pronounced when changing gear, and so far it appeared that the trouble had not been overcome entirely. A solution might be found, he suggested, in a thermostatic device which was being tested and which would control the temperature at which the change-over from one fuel to the other was made.

An increase of about 7% in miles per gallon was obtained in the experiment under review, the number of miles per gallon being 5·85 on petrol and 6·25 with petrol and creosote. The proportions used in the latter case worked out at approximately 75% of creosote to 25% of petrol. One feature in the use of creosote oil was that a castor oil must be used as the engine lubricant, and it seemed advisable to change this every 2000 miles, owing to the amount of base chamber dilution.

The author put forward a table designed to show how the various expense items might be expected to vary as the result of the use of the different fuels. The figures, of course, could only be approximate, in view of the many varying factors, as, for instance, the nature of the district served, average speed, annual mileage obtained from the vehicles, and seating capacities:

—	Petrol.	Paraffin.	Vapourising Oil.	Creosote Oil.	Diesolium Fuel.	Coal Gas.	Petrol-Creosote Mixture.
(*a*) Cost per gall.	11½d.	5d.	6½d.	7½d.	5d.	8d.*	10½d.
(*b*) Mileage per gall.	7·0	7·7	8·05	8·05	15·0	7·7	7·35
	d.	d.	d.	d.	d.	d.	d.
(*c*) Fuel cost per mile	1·64	0·65	0·81	0·93	0·38	1·04	1·43
(*d*) Licence costs	0·43	0·43	0·43	0·43	0·65	0·53	0·43
(*e*) Engine maintenance costs	0·4	0·5	0·50	0·50	0·60	0·40	0·40
(*f*) Lubrication costs	0·1	0·2	0·20	0·30	0·20	0·08	0·20
(*g*) Depreciation	1·44	1·44	1·44	1·44	1·68	1·44	1·44
Total (*c* to *g*)	4·01d.	3·22d.	3·38d.	3·60d.	3·51d.	3·49d.	3·90d.

* Based on equivalent heat units with petrol.

Assuming the figures were approximately correct, said the author, it would be seen that the high cost recorded under petrol was due entirely to the price charged for the fuel itself. Without the taxation the total costs would be very much the same for all the fuels recorded.

Vehicles using coal gas as a fuel must now bear an added duty, and it seemed unlikely, therefore, that vehicles using other home-produced fuels would be exempt from taxation to any material degree when they came into more general use.

Although an increase in employment would follow the general use of these home-produced fuels and so reduce the Government expenditure to some extent, it was doubtful that this reduction would enable any material rebate in taxation to be allowed. After all, it had been stated fairly definitely that the road transport industry must provide a certain annual revenue to the Exchequer. It would be wise, before deciding to embark on any large capital expenditure, to assume that sooner or later each vehicle, no matter what type of fuel was used, would contribute its fair share to the Government Exchequer.

Discussion.

Mr. G. Mackenzie Junner, who emphasized the importance of developing British fuels, said that recently he was travelling on a compression ignition engined 'bus, using a creosote fuel instead of a petroleum product, and the engine ran just as well as, or slightly better than, it had run on petroleum oil. The 'bus had a Gardner engine, and the only difficulty was that the in-

jectors had to be cleaned after every 2000 miles instead of after about every 5000 miles. No trouble was experienced with the exhaust.

With regard to coal gas, he said it seemed that many people had fought shy of it, perhaps through lack of knowledge, or the problem of carrying extra cylinders of gas. Some people seemed to be rather afraid of fire arising from the bursting of cylinders, and perhaps that fear might have been justified until recently; but a steel had been developed which could be used quite safely in cylinders. If bullets were fired through the cylinders they would make clean holes, and if there were a hole in a cylinder a flame would not go near it, because the pressure was so great that it would blow it away.

Mr. W. VANE MORLAND (General Manager and Engineer, Leeds City Tramways and Transport Department) said that the position with regard to the use of coal gas was somewhat complicated at the moment, in the sense that the weight of the cylinders in many cases would result in a reduction of the passenger-carrying capacity of a vehicle, bearing in mind the limitations imposed by the Ministry of Transport as to the total weight of vehicles. Recently there had been a demonstration in Leeds of a vehicle fitted with a number of gas cylinders. The experts were in attendance, and he was advised that there was no possibility of a cylinder bursting, owing to the make-up of the metal: all that it could do was to rip. The City Gas Engineer at Leeds had informed him that the Gas Industry was getting into touch with the Minister of Transport in order to secure, if possible, that vehicles so fitted should be exempt from the maximum weight regulations; apparently the negotiations were proceeding, and there was every possibility that some latitude would be given in the matter.

The position in regard to re-filling or re-charging the cylinders had been simplified considerably, and the City Gas Engineer had said that very shortly he would be in a position to quote a firm price—that the Transport Department would be able to take so much gas per annum, it would have its own re-filling plant, and the contract would give a flat rate over a term of five years. It was felt that that was one of the advantages which the transport industry would welcome, for operators of gas-fuelled vehicles would then be able to say that at any rate for five years their fuel costs would remain relatively stationary.

Emphasizing the importance of the problem of alternative fuels, he said he could not see that the recent decrease in the price of petrol would be sustained for any length of time, and that sooner or later we should be faced with a much firmer price for petroleum products.

Major R. MCCREARY, M.C. (General Manager and Engineer, Belfast City Tramways and Motor Department), said he believed the Belfast Gas Undertaking could claim to have gone as far as, if not farther than, any other gas undertaking in the matter of producing a creosote fuel suitable for use in motor 'buses. It could also claim—and he had the information from users of the fuel from the Belfast Gas Undertaking—that the fuel was uniform. That would dispose of one of the big difficulties in the use of this particular fuel.

London and Southern Juniors Visit Southampton

Summer Outing and Ladies' Day

The Summer Visit and "Ladies' Day" of the London and Southern District Junior Gas Association at Southampton on June 10 proved most enjoyable.

By the kind invitation of the Directors, an inspection was made in the morning of the works and plant of the Southampton Gaslight and Coke Company, the visitors being met at Southampton West Station and conveyed to the works by motor coach.

SOUTHAMPTON GAS-WORKS.

The works of the Company are situated in Britannia Road, Northam, and are provided with wharves fronting the River Itchen; the area covered is about sixteen acres. Coal is brought to the wharves in steamers carrying 1800 to 2000 tons and is unloaded by a pair of electric cranes, which are capable of dealing with a total of 150 tons per hour; it is thereafter transported over automatic weighing machines and belt conveyors to the various coal stores.

The carbonizing plant consists of two retort houses, one containing 24 Woodall-Duckham intermittent vertical chambers of a capacity of 2½ million c.ft. per diem, and complete with waste-heat boiler, coal and coke handling plant, quenching tower, &c. The other house is equipped with 25 beds of eight horizontal retorts, with Fiddes-Aldridge stoking machines, G.N. coke discharger, and telpher. The carburetted water gas plant consists of five Humphreys & Glasgow sets of a total capacity of 4,200,000 c.ft. per diem, the largest of the sets being equipped with waste-heat boiler and back-run gear.

Coke from the vertical chambers, after quenching, is dealt with by a special hoist discharging on to a quenching bench for further cooling, while that from the horizontal house is dealt with by telpher. The quenched coke is taken across Britannia Road by belt conveyor and elevated to a screening house over reinforced concrete bunkers. This house contains Nelson coke breaker and a set of primary and grading screens of the "Gyrex" and "Vibrex" patterns.

Electric current is generated at 220 volts by four gas engines driving D.C. generators of 225, 175, 50, and 50 KW. respectively. The larger pair of engines are of the four-cylinder type. Alongside the power house are blacksmiths', fitters', and electricians' shops.

The largest gasholder has a capacity of 2 million c.ft., and excavations are proceeding alongside for the erection of a new spirally-guided holder of a capacity of 3½ million c.ft. There are also on the works four other smaller gasholders, all of the column-guided type. Gas leaving the works is dealt with by electrically-driven and turbine-driven fan boosters, while for outlying districts there is also high-pressure plant consisting of two 115-h.p. gas engines driving Ingersoll compressors at 30 lbs. per sq. in.

The main-laying depôt, stove and meter repair shops, and stores are also situated at the works.

The Southampton Gaslight and Coke Company have, in all, nine showrooms, the principal being situated at the Central Office. This was open for the inspection of the visitors, together with the distribution depôt and stores at the Coliseum, Portland Terrace, a short distance from the Central Showrooms.

LUNCHEON.

Following the inspection, luncheon was served at the kind invitation of the Company at Messrs. Edwin Jones & Co.'s Restaurant, Queen's Buildings, when Sir Russell Bencraft, J.P. (Chairman of the Southampton Company), presided and was supported by the Mayor of Southampton (Councillor F. Woolley, J.P.), who was accompanied by the Mayoress, Col. Sir Edwin Perkins, C.B.E., Brigadier E. M. Jack, C.B., C.M.G., and Mr. A. W. Oake, B.A. (Directors), Mr. S. E. Whitehead, B.Sc., M.I.Mech.E. (Engineer and General Manager), Mr. J. Hughes Cornish (President of the Southern Association of Gas Engineers and Managers), and other officers of the Southampton Company.

The MAYOR OF SOUTHAMPTON said how glad he was to have this opportunity of welcoming the members of the Association to Southampton. He felt that he could welcome them in the name of the people, for they were engaged in one of the great industries of the country—an Industry which had weathered many and considerable storms. During recent years the Gas Industry had passed through a period of great transition and was holding its own against electrical competition. He hoped that the members would take away with them pleasurable memories of their visit.

The PRESIDENT (Mr. Arthur Tennant) proposed a vote of thanks to the Southampton Gaslight and Coke Company for their hospitality. He was sure that there was a unanimous feeling of gratitude at the hospitality which had been extended to them. The Southampton Company were particularly fortunate in their Chairman, Sir Russell Bencraft, and they were honoured in having him with them that day. Then Sir Russell Bencraft was fortunate in having as his Chief Officer Mr. S. E. Whitehead. Mr. Tennant also expressed pleasure at seeing other of the Company's Directors present, and also Mr. Cornish; and he paid tribute to the perfect organization of the Company which they had witnessed that morning.

The vote of thanks was seconded by Mr. H. C. SIMS (Senior Vice-President), and heartily accorded.

Sir RUSSELL BENCRAFT expressed his thanks for the reception they had given him. He was proud to be at the head of such a concern as the Southampton Company; no Company had a finer staff, and he was grateful for the efficient way in which they carried out their duties.

Mr. S. E. WHITEHEAD also acknowledged the vote of thanks, and said that they considered it a great compliment to the Company that the Association should visit their works. They were proud of their Chairman, and the efficiency of the staff was in no small measure due to him and his co-Directors.

THE M.V. "OLYMPIC."

Following luncheon the party were conveyed by motor coach to Southampton Docks, where, by special intervention of the Southern Railway—in the ordinary way the Docks are closed on Saturdays—they were enabled to spend a most enjoyable afternoon on a conducted tour of inspection of the White Star liner M.V. "Olympic." At the conclusion of the inspection the members and their friends were free to enjoy the charms of Old Southampton and its environs.

THE "JOURNAL" TECHNICAL RECORD

Which contains Reports of Meetings of Gas and Allied Associations

Direct Recovery of Standard Road Tars*

By F. Cooke, F.I.C.

In February, 1930, the author had the privilege of presenting a detailed account of a process† for the production of road tar which had been developed at the coke oven plant at Wombwell Main Collieries, Barnsley, and in view of the interest shown in the original paper it is desired to relate the progress made in the intervening period.

Operation on Coke Ovens.

At the above works the process has functioned continuously, without interruption, since May, 1928, and the general arrangement of the plant is shown diagrammatically in fig. 1.

Removal of Ammonium Salts.

At Wombwell Main, however, ammonia is recovered by the direct process and the fixed ammonia liquor is concentrated by continuous spraying into the hot gas entering the tar extraction plant and is finally evaporated for the crystallization of commercial ammonium chloride. As a result of contact with this liquor the road tar at this plant contains slight traces of ammonium salts, and although quite unnecessary for marketing purposes it is considered preferable to remove the salts by washing the road tar with wet steam in tank 7.

The hot road tar is separated from wash liquor by

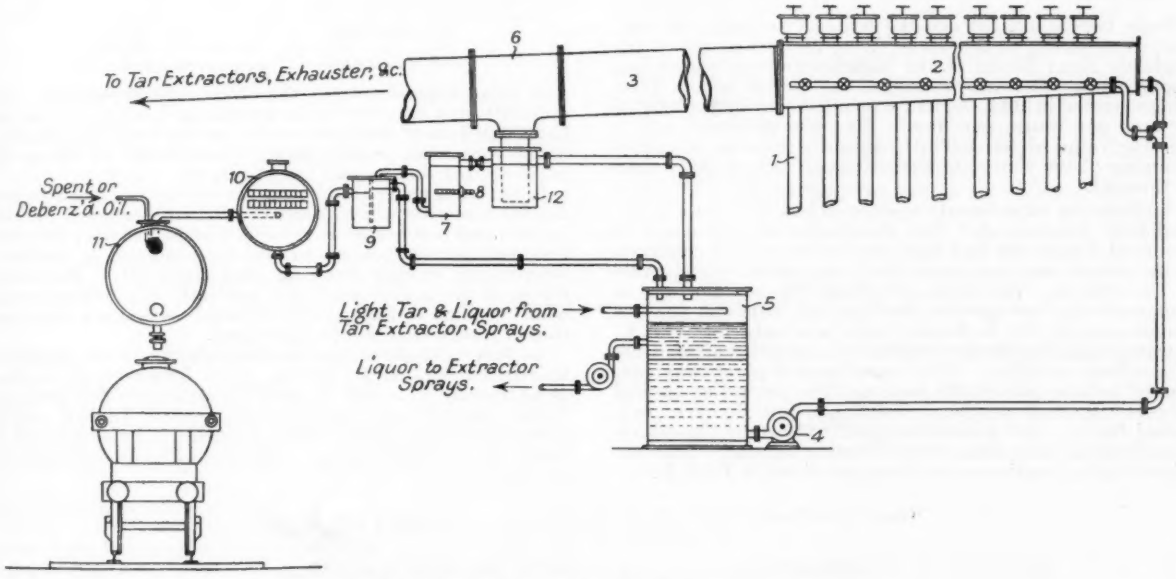


FIG. 1.—ROAD TAR PLANT AT WOMBWELL MAIN COLLIERY.

The process is operated by passing the hot gases from the ovens or retorts up the ascension pipes 1, into the collecting main 2, which is connected at one end to the foul gas or air cooled main 3. The two mains have a continuous fall in the direction of gas flow, and tar is circulated through them by pump 4 and gravitates back to tank 5, accompanied by the heavier tar fractions which have condensed from the gas.

The vital feature of the process is that road tar of any desired standard is withdrawn from the air cooled or foul gas main at a point 6, at which the temperature of the gas is still above the dew point of the lighter tar constituents which pass forward with the gas. By simple manipulation of this fundamental physical condition of the foul gas stream, road tar may be produced, continuously or intermittently, such road tar being superior in important respects to that produced by dehydration or distillation in stills, and it fulfils in all details the British Standard Specifications for Tars Nos. 1, 2, and 3.

Perfectly dry road tar may be run while hot from the seal pot 12 to the receiver 11, where the viscosity is checked and adjusted, if necessary, by mixing with oil or road tar of suitable consistency.

gravity in tank 9 and passes to a Wikner steam-heated dryer 10, which reduces the water content of the road tar to 0·25%. From the dryer the hot road tar flows into the receiving tank 11, and any correction of viscosity is made by addition of oil, or of road tar, of suitable viscosity. The creosote recovered from the gas in the subsequent condensers is also used for correcting the tar viscosity, but gas oil, debenzolized creosote, or spent scrubbing oil, are equally satisfactory for the purpose.

After viscosity correction the hot road tar gravitates to any desired point of loading.

To return to the foul gas stream, the lighter tar vapours pass forward to tar extractors, being sprayed simultaneously with ammonia liquor, which reduces the gas temperature from about 160° to about 85° C. The extracted tar and the spray liquor drain into tank 5, where they separate by gravity, the liquor being re-circulated through the sprays and the lighter tar mixing in tank 5 with the tar from seal pot 12, for re-circulation through the gas mains by pump 4.

Analyses of the road tar produced are given in Table A, with the British Standard Specifications for comparison, and they illustrate the satisfactory qualities possessed by the tars. It may also be stated that soft and medium pitches may be produced, and it is hoped to reach hard pitch as a result of further research in the near future.

On numerous occasions quantities of crude tar have been

* Paper read before the Midland Section of the Coke Oven Managers, Association.

† Sole licensees, Messrs. W. C. Holmes & Co., Ltd.

TABLE A.—*Analyses of Road Tar Products at Wombwell Main Colliery.*

[Direct System of Ammonia Recovery.]

—	Tar No. 1. A	Tar No. 1. B	Tar No. 1. C	B.E.S.A. Standard Tar No. 1.	Tar No. 2. A	Tar No. 2. B	Tar No. 2. C	B.E.S.A. Standard Tar No. 2.	Tar No. 3. A	Tar No. 3. B	Tar No. 3. C	B.E.S.A. Standard Tar No. 3.
Specific gravity	1·190	1·195	1·200	1·140 to 1·225	1·205	1·210	1·217	1·150 to 1·240	1·235	1·238	1·243	1·160 to 1·260
Water . . . . %	0·25	0·20	0·25	Max. 0·5	0·25	0·25	0·25	Max. 0·5	0 2	*Nil*	*Nil*	Max. 0·5
Oils to 200° C. . . ,,	0·6	0·5	0·6	Max. 1·0	0·6	0·8	0·6	Max. 1·0	0·3	0·3	0·5	Max. 1·0
Oils 200°-270° C. . ,,	13·4	12·5	13·0	9·5/21	11·7	9·7	8·8	8/16	6·8	6·3	6·2	6/12
Oils 270°-300° C. . ,,	6·8	5·9	6·2	3·5/12	6·1	6·3	6·0	3·5/12	5·0	4·8	4·4	3/8
Phenols . . . . ,,	2·3	2·1	2·2	Max. 5·0	2·1	2·1	2·0	Max. 4·0	1·5	1·2	1·0	Max. 2·0
Naphthalene . . ,,	1·8	1·6	1·5	Max. 6·0	1·3	1·5	1·2	Max. 5·0	1·3	1·1	0·9	Max. 3·0
Free carbon . . ,,	11·1	11·5	11·6	Max. 20·0	11·8	12·9	12·5	6/21	12·8	13·0	13·9	8/22
Viscosity . . secs.	10*	17*	27*	10/40*	44*	70*	95*	40/125*	93†	100†	120†	70/120†

* Hutchinson Viscometer. † B.R.T.A. Viscometer.

purchased and converted into road tar by running it into the tar circulated round the gas mains. It has thus been possible to work up as much as 40 tons per day of purchased tar, in addition to the normal production of 15 to 20 tons per day from the plant.

The gases from the tar extractors, which still contain water vapour, all the "free" ammonia, quantities of creosote oil and naphthalene, together with the whole of the benzole contents of both tar and gas, pass successively through the exhauster saturator and condensers to the benzole scrubbers. In the condensers, creosote oil and naphthalene are recovered, and the creosote is used for benzole scrubbing purposes, being amply sufficient for such requirements.

EXPERIMENTS ON GLOVER-WEST VERTICAL RETORTS.

Some twelve months ago the writer was invited to conduct experiments on the Glover-West vertical retorts at the Rochdale Road Works of the Manchester Corporation Gas Department. The retorts were of the earliest Glover-West design erected in 1914 and had a nominal coal throughput of 2½ tons per retort per day. The gas produced had a calorific value of 460 B.Th.U. per c.ft. gross by virtue of steaming of the charge to the extent of 20% of the weight of the coal.

Preliminary experiments upon one bed of 8 retorts immediately demonstrated that standard road tars could be produced despite the fact that the design and the condition of the retorts were not conducive to successful introduction of the process. The crude tar from the settings was of comparatively low specific gravity, and although the gas temperature in the hydraulic main was only 135°-145° C. it was possible to produce regularly quantities of road tar of excellent quality. This experimental plant was considered to have proved the merits of the process as applied to vertical retort practice, and the operations were continued for one year without any difficulty until the retorts were demolished under a reconstruction scheme. Data obtained during continuous working are given in Table B.

TABLE B.—*Vertical Retort Road Tar Operations (Rochdale Road Gas Works).*

[Indirect System of Ammonia Recovery.]

—	Crude Tar.	No. 1 Road Tars.			British Standard Tar No. 1.
Specific gravity . . .	1·089	1·147	1·154	1·161	1·140/1·225
Water . . . . . %	8·8	0·4	0·3	0·5	Max. 0·5
Oils to 200° C. . . ,,	6·4	0·9	0·4	0·4	Max. 1·0
Oils 200°-270° C. . . ,,	21·8	15·0	13·1	11·0	8/16
Oils 270°-300° C . . ,,	8·6	7·7	7·1	6·4	3·5/12·0
Phenols . . . . ,,	8·9	4·4	3·7	3·5	Max. 4·0
Naphthalene . . . ,,	Trace	Trace	Trace	Trace	Max. 5·0
Free carbon . . . ,,	3·6	7·7	8·8	9·2	6/21
Viscosity, secs., Hutch at 77° F. . . .	..	15	35	50	10/40

Gas temperature . . . . . 138°-144° C.
Tar ,, ... 71°- 83° C.
Tar in circulation . . . . . 1000 galls.

dale Road experiments on the older vertical retorts. No difficulty was experienced in producing from crude tar up to 2300 gallons of road tar per day on one bed, this quantity being equivalent to five times the quantity of crude tar produced per day by one bed of retorts.

It has been proved that road tar can be produced to any desired viscosity which fulfils the British Standard Specifications and is superior as regards specific gravity, free carbon, and tar acid content to road tar produced by ordinary dehydration in stills from the same crude tar. Moreover, the road tar is recovered in a perfectly dry finished state which renders it unnecessary to install subsidiary dehydration or distillation plant of any kind.

As fuller details of the experiments are to be published shortly by Mr. A. L. Holton, Chief Engineer of the Gas Department, it is not desired to anticipate his remarks further than to give the data contained in Table C and to state that it has been decided to install a finishing still to distil the hot road tar to pitch according to seasonal demands.

TABLE C.—*Vertical Retort Road Tar Operations (Partington Gas-Works).*

[Semi-Direct Ammonia Recovery.]

Analyses made during Production of Road Tar from Crude Vertical Tar.

Sample No.	Crude Tar.	1.	2.	3.	4.	5.	6.	7.	8.	9.
Specific gravity	1·100	1·122	1·146	1·148	1·149	1·153	1·156	1·159	1·162	1·168
Water . . . . . %	3·7	2·2	1·0	0·52	Trace	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*
Oils to 200° C. . . . . ,,	3·6	2·1	1·3	0·7	0·5	0·2	*Nil*	*Nil*	*Nil*	*Nil*
Oils 200°–270° C. . . . . ,,	21·6	19·4	17·7	15·4	13·0	14·0	13·5	9·7	8·1	8·0
Oils 270°–300° C. . . . . ,,	8·6	6·8	6·3	6·5	6·8	5·4	5·0	5·4	5·0	5·2
Phenols . . . . . ,,	7·7	7·2	5·6	4·8	4·5	4·2	4·1	3·1	2·9	2·4
Naphthalene . . . . . ,,	Trace	Trace	Trace	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*
Free carbon . . . . . ,,	5·50	6·50	7·64	8·64	8·81	9·57	9·82	10·6	11·50	14·2
Viscosity, secs, Hutch. 77° F. .	..	..	1½	4	9	14	23	59	129	215

Road tar produced per 7 hours' working . . . . . 696 gals.
Tar in circulation . . . . . 864 gals.
Gas temperature during working . . . . . 170° C.

FURTHER EXPERIMENTS AT PARTINGTON GAS-WORKS.

As a result of the successful operations on the vertical retorts at the Rochdale Road Works, it was decided to continue the experiments at the Partington Works of the same Corporation. Large-scale research has been conducted during the past few months upon one bed of 8 Glover-West vertical retorts of modern design, each retort having a nominal coal throughput of 5 tons per day and steaming being applied to the extent of 20% of the weight of the charge to produce 19,500 c.ft. of gas of 450 B.Th.U. gross per c.ft. per ton of coal carbonized.

From the first experiment at Partington it was apparent that excellent road tar could be produced and in much larger quantities than had been anticipated from the Roch-

GAS PRODUCER OPERATIONS AT BRADFORD ROAD GAS-WORKS.

In view of the successful results in utilizing the "sensible" heat of the vertical retort gases and the marked economies of such road tar production, it was resolved to conduct experiments at the Bradford Road Works of the Manchester Gas Department upon the hot producer gas from Trefois mechanically operated producers using coke breeze as fuel, the cleaned and cooled producer gas being used for heating the retorts. In view of the high temperature of the gas leaving the producer, it contains a considerable amount of sensible heat, and correspondingly large quantities of cooling water are consumed in dissipating this heat and in scrubbing the gas free from deleterious dust and tar.

XUM

Preliminary large-scale experiments demonstrated that crude tar could be distilled to road tar or pitch as desired, and a simple modification of the original process was installed at negligible cost. The plant has operated continuously, under licence, during the past ten months, producing road tar of excellent quality from crude tar. The latter consists of 85% vertical retort tar, with 15% horizontal retort tar. It is found that one producer will make up to 20 tons of road tar per day at exceedingly low capital cost and without increased labour charges. The heavy charges for water have been eliminated, and the extremely fine dust has been completely removed from the gas. Full data will be published in due course, as previously mentioned, but the following large-scale operating results in Table D illustrate the success attained.

This modified process* can be applied in similar manner to the manufacture of blue or carburetted water gas.

The above road tar has been put to a practical road test upon Broadway, Partington, the road being found quite satisfactory after numerous inspections.

TABLE D.—*Road Tar from Gas Producers (Bradford Road Gas Works).*

Analyses of Road Tar Produced.

Specific gravity	1·157	1·170	1·175	1·205
Water . . . . . %	*Nil*	*Nil*	*Nil*	*Nil*
Oils to 200° C. . . . ,,	0·1	0·5	0·25	0·5
Oils 200°–270° C. . . ,,	11·3	10·4	7·5	8·4
Oils 270°–300° C. . . ,,	6·6	5·0	6·1	4·6
Phenols . . . . . ,,	4·4	4·6	2·2	2·6
Naphthalene . . . . ,,	1·1	..	Trace	Trace
Free carbon . . . . ,,	13·5	..	..	..
Viscosity, secs., Hutch. 77° F.	54	78	174	370

Plant operating at rate of 15-20 tons of road tar per day.

Gas temperature entering plant	250°–300° C.
,, ,, leaving plant	100°–180° C.
Period of circulation	2 hrs. 40 mins.

In the production of road tar from vertical retort crude tar in stills, difficulty is frequently experienced in fulfilling specification requirements as regards specific gravity and tar acids, but no such difficulty has yet been encountered in the experiments at either of the vertical retort plants mentioned. The process is quite flexible and consistently produces dry road tar from the gas mains on the vertical retorts. It has not been possible to recover separately the oils from the gas leaving the experimental beds, because the gas passes into a common foul-gas main, but there is no doubt that these can be recovered if desired.

From the foregoing account it is to be hoped interest has been created in the endeavours to secure more economical operation in the industries with which we are concerned, and the following summary briefly states the results of the researches.

SUMMARY OF THE ADVANTAGES OF THE PROCESSES.

(1) There are no labour charges beyond those required when producing crude tar.
(2) The capital charges are almost negligible, existing equipment being all that is required for operating the process.
(3) The process can be applied to any system of carbonization and is functioning on vertical retorts, gas producers, and coke ovens producing road tar superior to that produced in stills from the same crude tar.
(4) The road tar produced is higher in specific gravity and in free carbon content than that produced in stills from the same crude tar.
(5) The process can be applied to any system of ammonia recovery, being in operation on "direct," "semi-direct," and "indirect" bye-product plants.
(6) Road tar and soft pitches may be produced of any desired consistency.
(7) Tar dehydration plant is eliminated.
(8) Fire risks of tar dehydration are totally abolished.
(9) Purchased crude tar in large quantities can be converted into road tar at negligible cost.
(10) Creosote oil is recovered in ample quantity for scrubbing and viscosity correction.
(11) Naphthalene is recovered of marketable quality.

* Brit. Pat. No. 386,832.

NOTES ON PLANT AND PROCESSES

Davis Gas Cookers.

The new gas cooker catalogue recently published by the Davis Gas Stove Company, Ltd., of 7, Stratford Place, W. 1, takes a new form in regard to its make-up in comparison with its predecessors. The width of the pages is doubled, thus enabling the illustrations of the apparatus to appear on the same page alongside the particulars and specifications relating thereto.

After a preliminary section which draws attention to some of the well-known features of Davis cookers—such, for instance, as the "Regulo"-controlled oven, with single burner and bottom flue outlet, the "Vertico" taps, "discbar" hotplate, and "Rado" boiling burners, together with details of the various enamel finishes in which the appliances can be supplied—the catalogue goes on to describe and illustrate the firm's "Alpine" "New World" cooker in several different types and sizes.

The "Hot Top" range has every "New World" feature—and three special advantages as well. The "Regulo"-controlled oven is raised upon legs to a height that makes stooping unnecessary, and the hotplate is alongside it. Above the oven is the "hot-top"—a solid cast-iron plate heated by a separate burner, which can be used for simmering, for keeping dishes hot, or as a convenient stand for vessels temporarily out of use. Beneath the hotplate is a second oven, for the cooking of milk puddings, the stewing of fruit, and, in brief, for all kinds of cooking needing low temperature.

The "Front Line" cooker is also included in the catalogue, and this, though not of the same high-grade construction as the "Alpine," is nevertheless an exceptionally reliable and serviceable gas cooker, and has all the special "New World" features—"Regulo" oven heat controller (as an extra); bottom flue-outlet; single oven burner; "discbar" hotplate, and "Vertico" safety taps. The "Front Line" oven is made of cast iron and the sides are finished black, even in the "Rado" enamel finish. The interior of the oven is lined with mottled enamelled steel plates. There are no gate runners to impede cleaning.

The Davis Gas Stove Company supply three kinds of porcelain enamel finish for their cookers—the "Beau," the "Semi-Beau," and the "Rado." The enamel throughout is of the finest quality; it is flint-hard with a high gloss and it will withstand years of hard wear. The "Semi-Beau" and the "Rado" finishes are grey, and the "Beau" green or blue, all finely mottled. The application of the finishes to the different series of cookers is shown in the illustrations in this catalogue.

Artesian Well Drilling.

Founded as far back as the year 1872 by the late Alfred Le Grand, the firm of Le Grand and Sutcliff (now Le Grand, Sutcliff, & Gell, Ltd., of Southall, London) came into existence as drillers of artesian wells. Since then their activities have steadily increased, and they have won the confidence of an ever-increasing number of clients.

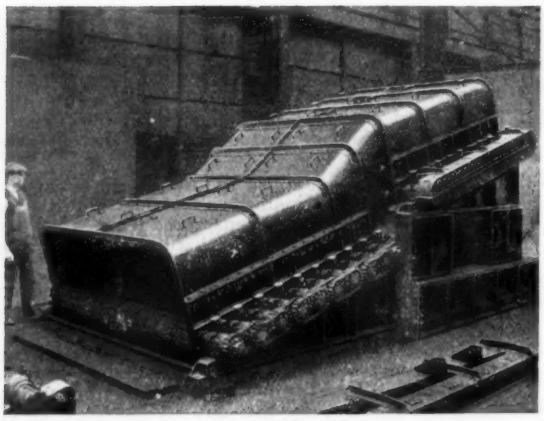
A most interesting publication recently issued by the firm describes and illustrates some typical examples of the many contracts upon which they have been engaged during the past few years, including a contract for a well-known gas undertaking, where it was impossible to drive piles in the usual manner owing to the close proximity of buildings which would be liable to damage by vibration. The difficulty was overcome by first drilling the necessary foundation holes by suitable drilling plant and then inserting the piles, the latter being securely fixed by grouting up with cement.

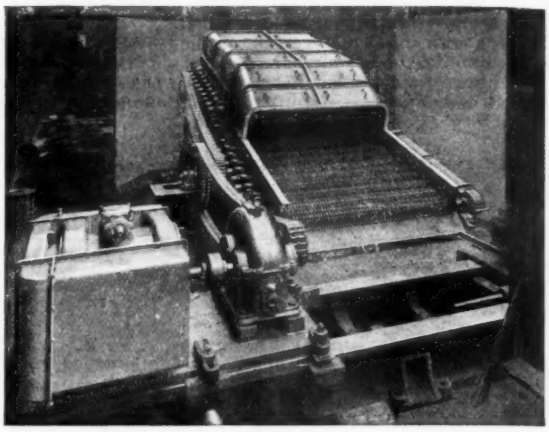
The question of an adequate water supply to gas-works is one of paramount importance, and the large consumption in most cases necessitates, if possible, a private supply such as that afforded by an artesian well. With up-to-date plant and machinery at their disposal, Messrs. Le Grand, Sutcliff, & Gell, Ltd., are favourably placed for expeditiously carrying out complete contracts for water supplies from underground sources, including shaft-sinking, heading-driving, and the installation of pumping plant, pipe lines, and reservoirs.

In addition, the firm undertake all forms of drilling operations, vertical or horizontal, such as are frequently

required with regard to shaft sinking by the freezing process and also in connection with harbours, bridges, roadways, and dams, including drilling for cementation—in fact, drilling work for all classes of civil engineering contractors' work. They have a staff of fully qualified engineers and geologists, and are prepared to solve the problems that frequently arise in the production and delivery of water from underground sources. During the course of years they have accumulated a vast amount of hydrogeological information.

A Giant Rotary Grizzley





Claimed to be the largest grizzley yet made, the accompanying illustrations show two views of a Fraser & Chalmers-Robins rotary cataract grizzley screen, recently manufactured at the Fraser & Chalmers Engineering Works, Erith, Kent, for a gas undertaking. This remarkable machine is capable of handling 1000 tons of coal an hour, screening 770 tons of 1-in. mesh through—*i.e.*, 77% of the total capacity. It consists of two units working in tandem, each having ten shafts, 84 in. wide, with 9½-in. discs. The Fraser & Chalmers rotary cataract grizzley can be supplied in any size from 50 to 1000 tons per hour.

BOOK REVIEWS

"B.E.A." HANDBOOK.

Within the next few weeks 5000 copies of the "B.E.A." Handbook of Members and their Manufactures (1933 Edition), published by the British Engineers' Association, 32, Victoria Street, S.W. 1, will have been posted to carefully selected known buyers of engineering products in the home and overseas markets, and experience of previous "B.E.A." Directory distributions justifies the confident expectation that a substantial increase in the flow of inquiries and orders to our members will follow. Copies will be posted free of charge to anyone interested in the purchase of British engineering plant, machinery, or accessories, on application being made to the Secretary of the Association.

The object of this Handbook is to establish a closer contact between buyers overseas and the engineering firms which are members of the British Engineers' Association. It is hoped to achieve this object by spreading more widely a knowledge of their products and facilitating the direct transmission of orders and inquiries to them by providing, in concise but clear form, the information required for that purpose. When special circumstances make it more convenient or desirable inquiries may be addressed to the Association, which undertakes to transmit them to any particular firm or firms that may be indicated by the inquirer, or, alternatively, it may be left to the Association to communicate the inquiry to selected member firms most likely to be able to fulfil the stated requirements.

Nowadays, engineering touches and influences the lives of all but the most primitive peoples at so many points that an enormous variety of engineering products have become indispensable to civilized life. It is, therefore, of the utmost practical importance that the best possible lines of communication should be established between the engineering manufacturer, the merchant, the agent, and the ultimate user of his products.

One of the chief objects of this Handbook is, therefore, to assist anybody wanting machinery or plant or any other product of engineering industry to acquire the means of satisfying their requirements. But the utility of such a Handbook does not end there. Another of its important functions is to create or stimulate the consciousness of an engineering want by showing the reader the vast number and variety of machines, tools, implements, &c., that are available for his use and economic benefit.

WILLING'S PRESS GUIDE, 1933.*

In introducing the Diamond Jubilee issue of "Willing's Press Guide," the publishers may feel a natural and pardonable pride in the sixty years of faithful and efficient service which they have been able to give to subscribers. During that period there have been drastic changes in publications, in their methods of production, and in their personnel; but Willing's can justly claim that there has been no change in their endeavour to maintain the usefulness and up-to-dateness of this Guide, which have established it as probably one of the most frequently used publications of its class in existence.

Although sixty years old, "Willing's Press Guide" is as young as on its first publishing day; young in outlook, young in alertness to note every new idea, young in willingness to make changes where they will provide for better service—but old in experience. The present edition shows that every feature has been retained that has made the "Guide" indispensable to advertisers, advertising agents, and publishers. Every detail has been checked, and, where necessary, brought up-to-date—the fullest essential information is given—yet all extraneous matter has been rigorously excluded in order to make the "Guide" easy and compact.

Included in the 1933 issue are particulars of over 6000 newspapers and periodicals in Great Britain and Ireland, together with a comprehensive list of the Colonial, Dominion, and Foreign Press, and much other useful information. The publishers acknowledge their thanks to the thousands of publications for their ready assistance in keeping the "Guide" correct and reliable, and feel confident that they have maintained the accuracy and up-to-date information upon which the reputation of "Willing's Press Guide" has been built.

* Published by Willing Service, 356-364, Grays Inn Road, W.C. 1; 2s. 6d.; pp. 502 + viii. (Sixtieth issue.)

Malta and Mediterranean Gas Company, Ltd.

GENERAL MEETING

The Annual General Meeting of the shareholders of the Malta and Mediterranean Gas Company, Ltd., was held on Tuesday, June 6, in the London Offices of the Company, 5, Great Winchester Street, E.C. 2—Mr. A. M. PADDON, M.Inst.C.E. (Chairman of Directors), presiding.

The SECRETARY (Mr. G. Murray Burton) read the notice convening the meeting, together with the certificate of the Auditors; and, by general consent of those present, it was agreed to take the Directors' report and statement of accounts as read.

THE CHAIRMAN'S ADDRESS.

The CHAIRMAN, in moving the adoption of the report and accounts, said that, in considering the statement before them, they would, of course, have realized that the figures and facts related to a period of very general depression no less marked in Malta than at home, and the inevitable features of such a condition had occurred—namely, a reduction in business and enforced economy, which in itself materially added to the decrease. They had sold less gas to the extent of about 9%, which was a common story in the Gas Industry during the past year, though it was rather more than the average decrease sustained by gas undertakings in this country. The circumstances, however, were rather more complex. There were the movement of troops and the transmutation of shipping to make the demand for gas more sensitive than was the case in this country. This had occasioned a loss in receipts amounting to £2915, while rentals from meters and stoves had been reduced by nearly £500. This was not by reason of the common causes he had just referred to, but as the result of a reduction in the rents and charges in connection therewith, which they had found politic in order to resist the truncation of their business.

Nothing, perhaps, served to cultivate the favour of the public to a greater extent than a reduction in the amount they had to pay for the instruments with which they utilized the gas. They were all aware how the consumer regarded the gas meter; he argued that it was peculiarly an apparatus belonging to the undertaking and that he personally got nothing from it. This was a superficial argument, but if they wanted to cultivate the goodwill of the public they could not do so better than by reducing the costs of the apparatus. So this £500 loss was actually a matter of deliberate policy. Their residual products, notwithstanding the reduction in the output of gas, showed an increase of nearly £500, due to an improvement in the market and an adjustment in the relative output of water gas and coal gas. One of the most favourable features of dual operation was that the output could be adjusted to meet the changing market for residuals—and this was an instance.

The accounts showed that the total receipts had been reduced by £2895. On the other side of the accounts it would be seen that raw materials had cost £825 less, and repairs and maintenance £1163 less, while salaries and carbonizing wages, as a natural outcome, were less by £342; and these together went largely to adjust the disparity in the account. Therefore, while decreased receipts accounted for £2895, economies had been effected to the extent of £2474, so that the reduction in profit was only £421, which, he thought, they would agree was very gratifying having regard to the present circumstances.

THE POSITION IMPROVED.

In the profit and loss (net revenue) account the first point was in regard to income-tax. They had debited themselves with over £400 in excess of what would be the comparative figure of a year ago. If this sum were set against the figure of £421 it would be seen that they had practically succeeded in maintaining their balance. Going into the details of this account, they had brought in £23,831 and had taken out £25,438, so that the position of the Company had improved by over £1600—and this in face of a condition of things which would not in the ordinary way have been productive of an increase.

The future was to a certain extent crucial, and it was incumbent upon the Directors and administration to meet reductions in the price of gas with economic courage. When receipts were falling it required a certain amount of decision to make them fall still further by decreasing the price of gas. But having regard to the price of gas in Malta—and it was very high—it was felt that in the face of intense competition they ought to make some reduction. They did not do this purely upon financial and economic lines. It was as a result of the present circumstances and in response to the Government gesture. It was a case of adjusting the load to suit the bearer, and they had therefore decided to reduce the price by 6d. per 1000 c.ft.—and this had been carried into effect. He did not deceive himself, however, nor did he attempt to deceive them, that this step was going to be immediately productive of an increase in the output of gas; if it only served to stop the decrease which was going on, they would be satisfied, while if it occasioned a better basis of relationship between the Company and the public they would consider the step a wise one.

It might be asked, How were they going to deal with the effect of this reduction? But after paying the dividends referred to, they had had during the past year the sum of £1600 largely going to meet this reduction without disturbing the interests of the shareholders; and this was the justification for taking this step. In addition, there was economy in regard to residuals and also in regard to their balance-sheet. The capital of the Company was £123,000, while if they looked on the other side of the balance-sheet they would find that the investments of the Company had a book value of £113,000; but at the time the balance-sheet was made out these would have realized £151,000, as against the capital of the Company at £123,000. The next thing was, What were these investments bringing in by way of interest, which was in no wise involved in the figures he had given them? By the strictest method of accounting, a certain amount of this interest was applicable to any curtailment in the receipts which might be due to deliberate policy such as he had mentioned. Therefore, they had every reasonable assurance that the step they had taken was secured by the position of their accounts generally and by their balance-sheet in particular.

He had explained that the difficulties in the past were still in front of them, but they had certain additional securities, such, for instance, as having bought their coal necessary for three-quarters of the next period, and they would endeavour to secure themselves so far as possible in that regard, so that their estimates might have a more solid basis so far as their purchase of raw material was concerned in the future.

So, while things were not bright—and he hardly knew where to tell them to look to find them so—he could assure them that the Directors would address themselves to the closest practicable measures of economy, so they might hope that—if they lived to see the shareholders twelve months from then—they would not have a bad report to present.

The CHAIRMAN then formally moved the resolution for the adoption of the report and accounts, which was seconded by Mr. A. W. OKE.

COMPETITION.

Mr. A. D. DODGSON inquired as to whether the competition with which the Company were faced was from electricity.

The CHAIRMAN replied that the competition was not solely that of electricity, but also of oil, as in this country. In Malta, moreover, they had not that measure of relief which had recently been afforded in this country by the tax on imported fuel oil, so that, commercially speaking, the competition with oil was the more severe.

Mr. F. R. SMITH, in congratulating the Board on the results, remarked that their balance-sheet was one which any gas undertaking in this country would be only too glad to have.

Mr. F. W. CHURCH, in endorsing what Mr. Smith had said, stated that the shareholders were very grateful for the lucid explanation which the Chairman had given them.

The resolution was then put to the meeting and carried unanimously.

DIVIDENDS.

The CHAIRMAN thereafter moved the declaration of final dividends at the full rates on the first and second preference shares and a dividend of 5% (free of income-tax) on the ordinary shares, making for the year (with the interim dividends paid in December last) a total distribution of 7% on the first preference shares; 7½% on the second preference shares; and 10% (free of income-tax) on the ordinary shares.

Mr. FRANK H. JONES, M.Inst.C.E., seconded the resolution, which was carried unanimously.

RE-ELECTION OF DIRECTOR AND AUDITORS.

The CHAIRMAN next moved the re-election of Mr. F. H. Jones as a Director of the Company. They all knew Mr. Jones, he said; he had been with them for a long time, and in the light of what he had just said in regard to what the Board had to do, they would realize what a valuable colleague Mr. Jones was and what an asset he was to the Undertaking. There was no one with a more general conversancy of gas company technique and administration, and he was concerned with both the largest and smallest undertakings—which was all to the good—and he brought his wide knowledge to the benefit of this Company.

Mr. E. L. BURTON, F.S.A.A., seconded the resolution, which was unanimously agreed to, Mr. JONES briefly acknowledging.

Mr. F. R. SMITH proposed, and Mr. F. W. CHURCH seconded, the re-election of the Company's Auditors, Mr. William Cash, F.C.A., and Mr. Hyde Clarke Burton, F.C.A., at the usual remuneration of 40 guineas. This was unanimously agreed to, and Mr. H. C. BURTON acknowledged their re-election on behalf of Mr. Cash and himself.

VOTES OF THANKS.

The CHAIRMAN then proposed a hearty vote of thanks to the officers and staff of the Company both at home and in Malta. Such a vote, he said, was at the present time of rather more value than in ordinary circumstances. In Malta they liked to know that the Directors and shareholders were appreciative of their efforts and assigned a due proportion of praise for what had been done. They had excellent officers and staff, and if the shareholders could see the works' returns from Malta they would realize that there was no company in this country with a higher technical efficiency. They had in Mr. Buckley an ex-

cellent General Manager and in Mr. Wilson an able Works Engineer, while their affairs were well looked after in London by their new Secretary, Mr. G. M. Burton.

The vote of thanks was heartily accorded.

Mr. G. M. BURTON, in acknowledgment, said that most of the vote should properly be sent out to Malta, but so far as the remarks referred to the London Office, he thanked them very much for their kind wishes, and he hoped they would always manage to carry out their duties in such a way as to afford their Auditors no difficulties.

The proceedings terminated with a cordial vote of thanks to the Chairman and Directors, on the proposition of Mr. F. W. CHURCH, seconded by Mr. A. D. DODGSON, which the CHAIRMAN duly acknowledged.

Croydon Company's Co-Partnership

ELEVENTH ANNUAL MEETING

A large gathering of co-partners and their wives attended the Eleventh Annual Meeting of co-partners in the Croydon Gas Company, held on Tuesday, May 30, at the North End Hall, Croydon.

Mr. WILLIAM CASH (Chairman of the Board of Directors) took the opportunity of addressing those present when he submitted the report and accounts of the co-partnership scheme, and the pension, widows', and orphans' fund, and he was supported on the platform by other Directors of the Company, and also the senior officers, including Mr. W. J. Sandeman (General Manager), Mr. F. F. Wood (Secretary), Mr. W. Grogono (Engineer), together with Mr. M. O. Coates (Editor of the Company's Co-Partnership Magazine) and representatives of the Co-Partnership and Works Joint Committee.

At the outset Mr. Cash extended a hearty welcome to all present on behalf of the Directors, saying how glad he was to meet them once again. He was pleased to say that they had all their chief officers with them that evening and all the Directors with the exception of Mr. Woodall and Mr. Hussey; the former, as they knew, was a very busy man, and he had sent a letter greatly regretting his inability to be present and wishing them all success. Mr. Cash also referred to the retirement during the year of one of their Directors, Mr. Rigby, who had been one of the Co-Partnership Trustees, and was for some years Chairman of the Co-Partnership Committee. He was for 43 years a Director of the Company and 31 years Chairman, and during the whole of that time he did a very great deal for the employees of the Company, always having their interests at heart.

As was customary on these occasions, he would refer to those co-partners and pensioners who had passed away during the year, and particularly to Mr. G. E. Walkley, who had been Chairman of the Co-partners' Representatives on the Co-Partnership and Works Joint Committee for some considerable time. Mr. Walkley was Chief Clerk at Waddon and had been in the service of the Company for 39 years, being very much liked among his colleagues and all those with whom he came in contact; Mr. Cash said he would like to bear testimony that he was a very faithful servant of the Company. He asked those present to stand for a moment in memory of all those who had passed away.

ACHIEVEMENTS OF THE YEAR.

Regarding what had been done during the past year, Mr. Cash called attention to the new sports pavilion, and also to the three new hard tennis courts, and he hoped that the co-partners would appreciate the pavilion. Another matter was the erection of the new lobbies and canteens at Waddon on the site of the old gasholder. There was also to be a new laboratory here. All this had involved very considerable expenditure, but the Directors felt that the new canteen was very necessary.

Then, in addition, new showrooms had been erected at Oxted, and a very successful exhibition had been held in that town at the same time. The showrooms had been excellently designed by their Architect, Mr. A. Douglas Robinson. The foundations of the new gasholder at Carshalton were commenced a year ago, and it was hoped that the holder would be put into operation in the course of the next month; this would greatly assist them in their supply of gas to the area.

Another matter in connection with which they were very proud was that Mr. Grogono had been presented with the Silver Medal of the Institution of Gas Engineers for his paper describing their new plant at Waddon. He had been very highly complimented on this plant, and it was interesting to note that representatives of the Institution of Gas Engineers and Leeds University had inspected the installation and had reported very favourably on it.

It was a matter for regret that for the first time for many years they had to report a decrease in their sales of gas. This, he had told the shareholders at the Annual Meeting of the Company, was due to a variety of circumstances. In the first place, 1932 had been a very warm year, and a great deal of their gas was sold for heating purposes; there was no doubt that people were economizing in regard to their use of gas, and, again, they were selling each year more and more efficient appliances, which undoubtedly economized gas. On the other hand, their business was extending; no fewer than 3200 new consumers were added last year, while the number of appliances sold or let out on hire amounted to nearly 13,000.

The year had also been notable for the erection of plant to produce benzole, which, after rectification, was sold as motor spirit. Mr. Cash then referred to the new tax of 1d. per gallon on imported fuel oil, which included the gas oil used in the manufacture of their water gas. He could not help feeling, however, that there were some compensating advantages in respect of the competition of gas with oil for industrial and commercial heating applications.

FINANCIAL RESULTS.

After referring briefly to some of the more outstanding financial aspects of the past year, as indicated by the Company's accounts, Mr. Cash said that they had made an issue of £50,000 5% stock, which was over-subscribed many times in a very short time—indicating the regard in which investors held the shares in the Company. He also drew attention to the hearty vote of thanks which the shareholders passed to the officers and staff of the Company at the General Meeting for their work during the past year, which was a genuine tribute of which they were really worthy.

Continuing, Mr. Cash remarked that he had received a report from the General Manager a short while ago in which he stated that on one occasion during the past year a special meeting was held at the request of the Co-Partnership Committee at which certain suggestions were put forward for consideration. He was pleased to say that some of these suggestions were of considerable value, and the Board appreciated these enormously, because it showed clearly that they were interested in the welfare of the Company. This bore out what had been said before regarding the happy relationship which existed between the co-partnership representatives and the management.

The underlying principle of co-partnership, said Mr. Cash, was "all for each and each for all." All their efforts had one common aim—namely, to unite the workers, the management, and the shareholders. Their consumers and potential consumers looked upon each one of them as "the gas company," on the district, in the showroom, in the works, and in all circumstances which brought them into touch with the public, and the Company was judged in accordance with the way they treated them. It was therefore very encouraging to the management to receive from time to time letters from consumers expressing appreciation of the attention which had been devoted to them and of the courtesy and obliging manner with which they had been treated. Those on the works could also help by looking carefully after all such matters as brought economy into their production processes and by carrying out their duties quickly and neatly.

Turning to the accounts in connection with the co-partnership scheme, Mr. Cash pointed out that the total amount of the bonus for the year was £12,652, being at the rate of 7%, which was the rate at which dividend on the sliding-scale stock of the Company was paid for 1932. This total sum had been dealt with as follows: Transferred to the pension fund (representing two-thirds of the members' contributions to that fund), £6827; and available for withdrawals and purchase of stock, £5824. Savings deposited during the year totalled £11,210 and withdrawals for the same period £14,302. The total cash deposits held by the Company on behalf of co-partners on March 31, 1933, was £42,973.

Mr. Cash drew attention to the paragraph in the report which stated that under the present rules of the scheme the balance standing to the credit of each co-partner (after his contribution to the pension, widows', and orphans' fund had been charged, and so long as he held not less than £10 stock of the Company) could up to £2 be withdrawn at any time, and as to larger amounts by fourteen days' notice to the Trustees. In the case of co-partners holding less than £10 of stock the available bonus would be applied by the Trustees to the transfer of stock to them until a holding of £5 was attained and thereafter by £1 (or under) per annum until the total holding of stock was £10. He also pointed out that the Co-Partnership Trustees had arranged from Dec. 28, 1932, that transfers of stock should be free of stamp duty to co-partners.

APPRECIATION OF INVESTMENTS.

Further investments of the pension, widows', and orphans' fund during the past year, went on Mr. Cash, amounted to £32,235, making a total amount invested of £274,601; and a valuation of these investments on March 31, 1933, showed a figure of £321,177, as compared with the original cost of £274,601—which was a very satisfactory feature, indicating an undisclosed additional asset of nearly £47,000. During the year £268 was collected for the hospital fund, and payments to the extent of £239 had been made. Another interesting feature was that the circulation of the most recent issue (January) of their Co-Partnership Magazine was the highest that had ever been reached.

Referring to some of the items in the accounts, Mr. Cash said that the bonus account indicated contributions to pension fund

amounting to £6827. Investments in the Company's stocks amounted to the substantial figure of £3317. In regard to the pension fund, the balance showed an advance of nearly £37,000, in spite of the fact that pensions paid out amounted to £10,146. The Company's contribution of £5414 was augmented by an additional £5800, together with a further special contribution of £10,000. The fund's income from investments had steadily grown, and the present figure of £13,505 included two years' income-tax repaid. In addition to the sum paid in pensions (£10,146), fifty annuitants, including widows of employees, received in the year £3927 direct from the Company in consideration of past services. They could not yet say whether the pension fund was adequate to meet their total liabilities on an actuarial basis, but, going on as they were, that date could not be far distant.

The balance-sheet showed investments in the names of three Directors as Trustees amounting to £274,601, while the list of their investments was one with which they ought to be thoroughly satisfied, the test being that they were worth considerably more than was spent on them. It would be noticed that a large number of the investments were in water undertakings, which constituted a very safe security.

In conclusion, Mr. Cash said he considered the present depression was only of a temporary character, and that when times improved the Croydon Company would go ahead again as they had done in the past—and when the demand came they were ready for it; their plant was in excellent order, with a substantial margin.

Report of Co-Partners' Representatives' Committee.

In presenting the report of the Co-Partners' Representatives' Committee, Mr. R. Richardson (Secretary) referred to the smooth working of the Committee, which, he said, existed as a lubricant to the wheels that ran the industrial machine of the Company. Every employee was assured that whatever was referred to this Committee was faithfully dealt with, and, if carried to the Management, received a full and sympathetic hearing, and, if possible, an adjustment. The Committee paid tribute to the Management for the way they had been met on all occasions—no rebuffs or frowns, but a welcome and an expressed desire to help—and this was much appreciated. At two of their meetings during the past year the General Manager had accepted an invitation to sit with the Committee to discuss matters vital to the interests of the Company.

They were pleased to report that the Directors had acceded to a request from the Committee that all shift workers be paid for seven shifts when taking their annual holiday, enabling them to enjoy this year for the first time a clear Sunday instead of having to return and take up duty on that day.

Having referred briefly to the recognition of the Committee as evidenced by their representatives being invited to the opening of the Oxted Showroom and also of the new pavilion at the Sports Ground, while they had during the past years attended the Annual Co-Partnership Conference at either Oxford or Cambridge, Mr. Richardson said they were often asked, What is the use of this Committee, and what has it done? Their answer was, The Croydon Gas Company was one of the largest employers of labour in the Borough; they had nearly 1300 employees—over a thousand of them co-partners—they had passed through these post-war years, with all the unrest and strife, free from labour troubles. And this was because they had access through this Committee to the Management for any complaint or misunderstanding which might arise; and, if not satisfied with the Management's decision, the Committee could carry the matter to the Chairman of the Company and the Directors at the joint meeting, and thus they were assured of a fair and square deal for every employee; and this was the contributing factor to the smooth working of the concern.

They appealed to every employee not only to use this Committee as a clearing house for all complaints and grievances, but to hail it as a stepping-stone to raise the status of labour. Their one desire was to seek and maintain that right relationship between employer and employee. They wanted this Committee to become the "radiation" centre of the Company—but let it be light without heat! That they would all imbibe the true spirit of co-partnership and become more active ambassadors for the Company they served was the sincere wish of the representatives on the Co-Partnership Committee.

Long-Service Awards.

Long-service awards in the form of signed certificates were presented by Mr. Cash to the following co-partners who have completed twenty-five years' service with the Company:

Messrs. W. R. Blake (Plater, Manufacturing Department), F. H. Burchell (Showroom, Purley), R. Clark (Engine Attendant, Manufacturing Department), D. C. Flynn (Prepayment Collector), J. H. A. Gregg (Clerk, Rental Department), W. E. J. Hall (Stove Fitter, Sales Department), A. A. Hill (Lorry Driver, Sales Department), A. W. Jell (Stoker, Manufacturing Department. Pensioned, March 17, 1933), F. T. Linfield (Fitter, Sales Department), G. F. Lock (Fitter, Sales Department), J. McCarthy (District Inspector, Wallington), F. T. Paxton (Fitter, Sales Department), E. Pelham (Stores Assistant, Katharine Street), G. Tebb (Works Foreman, Manufacturing Department), H. W. Tofield (Prepayment Collector), and A. Waters (Clerk, Distribution Department).

A hearty vote of thanks was accorded to Mr. Cash on the proposition of Mr. O. Arnold, the Chairman of the Co-Partners' Representatives on the Co-Partnership and Works Joint Committee, and the Chairman briefly responded, after which refreshments were served, and the remainder of the evening was devoted to a concert entertainment which was much enjoyed.

Board of Trade Inquiry at Coatbridge

On Monday and Tuesday of last week a Board of Trade Inquiry was held in the Municipal Chambers, Coatbridge, Lanarkshire, into an application by the Coatbridge Gas Company for a re-definition and extension of its existing limits of supply, and for powers to levy differential charges (*a*) in parts of its existing limits, and (*b*) in certain proposed added limits.

The Commissioner was Mr. James F. Ronca, Director of Gas Administration, Board of Trade.

The applicants were represented by Mr. Jacques Abady, and the other parties present were: Mr. W. D. Patrick, for Dumbarton County Council; Mr. R. P. Morison, for Lanark County Council; Mr. David Patrick, Town Clerk, Kirkintilloch, for Kirkintilloch Town Council; and Mr. Thomas Thomson, Town Clerk, Airdrie, for Airdrie Town Council, all of whom had lodged objections to the Order.

During the course of the proceedings agreement was reached between the applicants and Airdrie Town Council, as a result of which that body withdrew its opposition to the application. The principal objections were at the instance of Dumbarton County Council.

Mr. *George Braidwood*, Manager of the Coatbridge Gas Company, was the first witness. He said that at present the Company were supplying gas at Calderbank, Glenmavis, Glenboig, Rhindsmuir, Kirkwood, and other places. During the last few years they had spent £15,000 on extensions of mains and services. In 1919 they had 72 miles of piping laid; in 1932 they had 84·75 miles. They had not incurred any capital expenditure since 1931, when they had incurred a capital expenditure of £2000. The consumption of their gas had gone up greatly since 1922.

The area supplied with gas by his Company was one which suffered severely from industrial depression. Notwithstanding that, their financial results had been very good. Their expenditure on mains and services since 1920 had been £115,000; on meters, £5000; water gas plant, £4000; offices, £4000; gasholder, £7000; sulphate of ammonia plant, £1300; additions to carbonization plant, £78,817.

With regard to the present application, his Company proposed to lay, from the 8-in. duplicate main in Locks Street, Coatbridge, a steel main to Chapelhall and Salsburgh. They were also proposing to a lay a considerable mileage of 4-in. mains in those two places so as to radiate for their distribution centres. The estimated cost of that combination of 8-in. and 4-in. mains in connection with their present scheme was £10,600. At Salsburgh and Chapelhall there were 840 houses, and they were calculating that gas would be taken into one-half of those houses. They were assuming a consumption of 70 therms per house, based on their experience at Glenboig and Annathill. When asked why his Company had not been able to give a supply of gas in certain parts of their existing limits, Mr. Braidwood said that it had not been an economic proposition so far. They hoped to make it economic by getting a differential rate. Of course, many new houses had been built at Glenmavis and Wattstown, near to Greengairs, which made the proposition more attractive. Their proposed extension to Luggiebank, in their existing area, was bound up with their getting an extension from the Board of Trade to Cumbernauld village. It would not pay the Company to go to Luggiebank unless they went to Cumbernauld. They intended to carry out each of their proposed schemes, one after the other, as they could finance them, if the Board of Trade granted the powers sought.

In cross-examination by Mr. W. D. Patrick, witness admitted that the applicants by their proposals intended more than to double their area of supply. They had been supplying gas since 1877.

Mr. W. D. Patrick: Is it not the case that almost one-third of your present area, representing 14 square miles, is not yet developed?—That may be so on an acreage basis, but not on a house basis.

Nevertheless, with one-third of your present area undeveloped, you would like to double your area of supply?—But green fields require no development. [Laughter.]

Now, in that connection, I noticed that you said that you proposed to develop the new areas as and when you could finance them?—That is right.

Am I to understand from that that your present finances do not permit of your developing the arid areas?—Our present finances do permit of our developing the new areas, but we must expend the finances in such a way that we shall not upset our present gas rates to our present consumers.

Can you give us any reasonable assurance that you will be in Cumbernauld, shall we say, and Croy, on the north-west of your area, within two years or three years?—That entirely depends on our getting a differential rate.

Is there no one who is going to give the County Council of

Dumbarton some sort of assurance that this detached portion of their area is going to be developed in the near future?—I should like to assure you that that is our reason for promoting this Order, to develop those areas.

No doubt, but I want to know whether you can give me any indication of the time when you will be in Croy, shall we say?—I am not in a position to give you a definite answer to that. Our estimates assure us that we shall be able to make an economic success of our scheme at the proposed differential rate of 3·6d. in certain places and 2·4d. in others.

Mr. Braidwood said he was aware that in the Dumbartonshire area involved—Cumbernauld, Condorrat, and so on—there was at present a supply of electricity. He did not admit that there was no demand there for the introduction of gas. His experience was that where gas was made available it was taken advantage of by the householders, for cooking and heating.

Mr. *William Flockhart Anderson*, C.A., Secretary of the Coatbridge Gas Company, produced a statement showing the share and loan capital, authorized, raised, and expended, of the Coatbridge Gas Company. This statement showed the original stock and the stock issued by virtue of the powers contained in the Coatbridge Gas Act of 1877 and the Coatbridge Gas Orders of 1898, 1902, and 1916. Under each of those authorities the amount authorized had been raised. The applicants were authorized by the Order of 1922 to raise £25,000, including premiums. They had not raised any of that money. With regard to the loan capital, the Coatbridge Gas Order had authorized them to raise £86,790. Of that sum, £47,775 had been raised by Feb. 22, 1933. The total share and loan capital to Feb. 22, 1933, authorized was £231,440, and they had issued £167,425. That showed a balance unexpended of £64,000. The estimated capital cost of the proposed scheme at Rigghead, Wattstown, Greengairs, Luggiebank, and Cumbernauld was £13,400. To that sum had to be added the capital expenditure, £10,400, in respect of Condorrat and Twechar, making £23,800; then there was an estimated expenditure of £10,600 for Chapelhall and Salsburgh, giving a total of approximately £34,000, so that for the purpose of carrying out the works contemplated in the present Order the Coatbridge Gas Company had an ample margin of money.

In addressing the Commissioner at the conclusion of the evidence, Mr. W. D. PATRICK said that in the Dumbarton area there was no demand for a supply of gas. In the present state of national finance was it in any sense desirable that a demand for gas should be encouraged in that area? The supply of gas to those houses for heating served no national purpose. The houses were adequately heated at present by coal drawn from the local mines. It was desirable, he should have thought, in the national interest, that every ton of coal that could be raised should be raised.

The decision of the Commissioner will be issued later.

Municipal Undertakings, 1932-33

Accrington.

The Accrington District Gas and Water Board have made a net profit on gas, after meeting all the standing charges, of £4587, or £1072 more than last year. They are in the happy position of now having in the gas reserve the sum of £20,463.

Blackburn.

The annual report of the Blackburn Corporation Gas Department shows that the total quantity of gas made was 1,085,781,000 c.ft.—an increase of 2,541,000 on the previous year. Notwithstanding trade depression and other disturbing influences, the sale of gas appliances during the year had been a remarkable feature. The total value of sales passed through the showrooms amounted to £16,584—approximately £350 a week.

Brighouse.

The gas sent out during the year amounted to 210 million c.ft., being 13 million c.ft. more than in 1931-32—an increase of 6·5%. This is very encouraging in view of the depressed conditions of local industries. The gas unaccounted-for is 3·75% of the output. Residuals have yielded 67·6% of the cost of coal, as compared with 56·0%. This happy result is due to two factors: First, cheaper coal; and, secondly, the return from benzole has made a great difference. "Brighouse," states Mr. C. R. Ingham, the Engineer and Manager, "was the first gas undertaking to install plant of this type, and the Committee have reaped the reward of their enterprise."

Darwen.

The Darwen Gas Department, on which, in 1932, there was a net loss of £609, now shows a net profit of £3561, notwithstanding a reduction of 4·33d. per 1000 c.ft. in the price, costing the undertaking £2980. There had been an increase of 4·26% in the consumption. It was reported to the Town Council on June 1, that the new vertical retorts put into commission on May 2, had worked with satisfactory results, and they could confidently anticipate the quality of the gas being improved. Coke also had improved. It was an excellent result for a period of arduous reconstruction.

Nelson.

Mr. James Mitchell, late Engineer and Manager to the Nelson Gas Department, reports a net profit of £12,043. There was a profit of £90 on the concentrated ammonia plant, this profit being an increase over 1931-32 of £18. The total quantity of gas delivered during the year was 573 million c.ft., being a decrease of 0·97%. Ordinary meters accounted for 34%, and prepayment meters for 49% of the total consumption. There are now 17,472 consumers; 5919 of these have ordinary meters, and 11,553 are provided with prepayment meters; being an increase of 73 consumers during the year. The average consumption per ordinary meter was 31,718 c.ft., while the average consumption per prepayment meter was 24,286 c.ft. "In conclusion," states Mr. Mitchell, "as this will be my last annual report, I should like to avail myself of the opportunity to express my thanks to the Chairman and members of the Gas Committee for the confidence they have reposed in me during my years of office, and also to all employees for their loyal support and co-operation at all times, contributing to the success of the Department."

Nottingham.

The annual report of the Nottingham Corporation Gas Committee, of which Alderman Sir Albert Ball is Chairman, shows a net profit of £66,822. To this there had been added the balance brought forward from the previous year and a further amount recovered in connection with the Rex *v.* Ball case, making a total of £100,838. This has been appropriated to the extent of £31,500 contribution in aid of rates, and £44,249 in transfers to renewals fund and capital account, leaving a balance of £25,088 to be carried forward to next year. The quality of Nottingham coke continues to ensure a ready market. Much greater care, however, is now being paid to the domestic market by the furnace coke makers, and the competition from this source is likely to increase. The report of Mr. G. Dixon, the Engineer and Manager, which was attached to that of the Committee, affords the information that the total gas made and purchased during the year was 2943 million c.ft. The sales of gas show a decrease of 2·51% on 1931-32.

Stafford.

The annual statement of accounts of the Stafford Corporation Gas Undertaking shows that the gross profit for the year ended March 31 amounted to £19,127, against £17,422 in the previous year—an increase of £1705. After deducting charges for services of debt amounting to £12,988, there remained a net profit on the year's working of £6139. The amount of gas made was 348 million c.ft., compared with 345 millions in the previous year—an increase of 1·04%.

Wigan.

Wigan Gas Undertaking will soon be free from capital debt. The gross profit on the past year's working was £18,878, a decrease of £155 compared with the previous year, and the net profit £11,380, compared with £2748 for 1931-32—an increase of £8632. The total income for the year was £118,843—a decrease of £687, owing to the reduction in the price of gas. The net debt of the Undertaking at March 31 last was £45,218, and there stands to the credit of the reserve and renewals fund about £24,200, so that there is only about £21,000 outstanding.

Workington.

The gas produced during the year ended March 31 amounted to 195,720,000 c.ft., or 841,596 therms, which is an increase of 3·13% over the previous year and a record output for the Undertaking. The following figures show the progress of the Undertaking during the past 30 years.

Year.	Gas Made.
1903	91,797,000 c.ft.
1913	114,775,000 ,,
1923	162,104,000 ,,
1933	195,720,000 ,,

The gas produced per ton of coal carbonized was 20,107 c.ft., equivalent to 86·46 therms; the gas sold per ton of coal carbonized being 19,359 c.ft., or 83·24 therms. The reconstruction of No. 3 setting was carried out during the year at a cost of £2540, and the whole of the vertical retort installation has worked satisfactorily throughout the year. The net return from the sale of residuals is 39·32% of the cost of the coal, against 37·69% for the preceding year. The financial position of the Undertaking has been well maintained, and the results for the year show a net profit of £1120, against a net profit of £1150 for the previous year. During the year under review the gas supplied in bulk to the Harrington Urban District Council amounted to 12,299,400 c.ft. The total length of mains in the district of supply is now 33·28 miles. The following new gas appliances have been supplied during the year: Cookers, 151; gas fires and radiators, 84; gas wash boilers, 101; hotplates, 197; miscellaneous gas appliances, 154.

Register of Patents

Purifier Valves.—No. 388,128.

CLAPHAM, T. A., of Keighley.

No. 31,097; Nov. 10, 1931.

This invention consists in the production of dual valve devices to have valve seatings and a chamber for enclosing them mounted on each side of the apparatus so constructed and arranged as greatly to facilitate their manipulation to adjust or secure the flowing of the gas in one direction or the opposite direction or otherwise, as is required. This is effected by the connections thereto for regulating and adjusting the valves being brought into such relative positions that the attendant can effect all the necessary adjustments by operating two hand-actuated members on each side of the apparatus.

Water Heaters.—No. 388,210.

RADIATION LIMITED, of Birmingham, and YATES, H. J., of Grosvenor Place, S.W. 1.

No. 5632; Feb. 25, 1932. No. 24,750; Sept. 5, 1932.

This invention relates to gas apparatus for heating water or air, of the kind in which hot gases from a burner are conducted upwards through a vertical metal conduit. In such apparatus it is usual to provide transverse baffles in the conduit.

The main object of the invention is to enable the partitions to be readily mounted in position and removed when desired, and to ensure good thermal conductivity between the partitions and the surrounding wall of the conduit. A further object is to provide a modification whereby it is possible conveniently to provide within the vertical conduit an annular passage for the hot gases rising from the burner, thus minimizing the capacity of the conduit.

The invention comprises the combination of a plurality of metal partitions shaped to provide spaces for the flow of gases between them and the conduit, resilient supports associated with the partitions, a screwed stem passing through the partitions and supports, means for separating the partitions, and a nut on one end of the stem, the arrangement being such that when the nut is screwed down the stem, the partitions expand the supports and cause them to grip the conduit.

The invention also comprises the combination of a tube of suitable cross section which when placed in the conduit forms an annular passage for the hot gases, end partitions on the tube, resilient supports co-operating with the partitions, and a screwed stem passing through all the parts, the arrangement being such that by means of a nut on the stem the supports can be expanded into engagement with the interior of the conduit for holding the tube and its associated parts in position.

The Year's Working at Barrow.

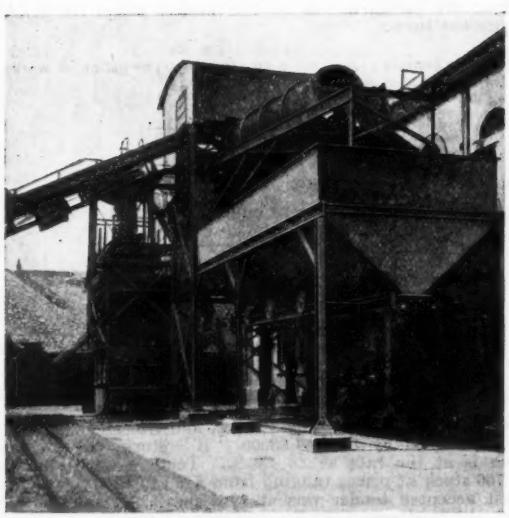
At a recent meeting of the Barrow Town Council, the Mayor (Alderman Marton) presiding, Councillor Clement, Chairman of the Gas and Water Committee, moved the adoption of the Committee's minutes, and in doing so referred to the results of the working of the Gas and Water Undertakings for the last financial year.

In the Gas Department, he said, we have sold 362 million c.ft., which is approximately the same as in the previous twelve months, and have carbonized 27,648 tons of coal, or 1380 tons less than in the previous year. This is our first full year of working the new plant at Salthouse, and I venture to think our results are highly satisfactory, not only to the members of the Committee and their staff but also to this Council and the consumers. We have been able produce an average of 14,432 c.ft. of gas per ton of coal used throughout the year, which is 1202 c.ft. per ton more than for the previous year.

Our consumers have increased by 138, and 85 additional cookers have been sent out on simple hire. The sales of the improved cooker are very satisfactory; 83 have been sold on the hire-purchase system and 46 sold outright. The total value of apparatus disposed of in this way, during the year, is approximately £1594. The residual market has not improved much. Tar prices have averaged 11s. 1d. per ton better than in the previous year, but we have made 40 tons less than we did during the preceding twelve months. Under our new scheme for the delivery of coke to consumers we have sent out 1412 tons, and we hope to develop this side of our sales still more in the early future.

One set of condensers and purifiers has been taken from Hindpool and set up at Salthouse, with satisfactory results, and the whole of the street lamps have been fitted with automatic controllers, in order to reduce the necessity for night and Sunday labour to a minimum.

We have reduced the loss of £5263 in the previous year to £482. We have also turned a debit in our renewals fund, at the beginning of the year, of £2887 into a credit balance at the year end of £121. Altogether our Gas Department is just over £10,000 better off than twelve months ago. We hope to continue to make good progress and to wipe out in the early future the loss standing against the Department of £9511 that has accumulated during the last three years.

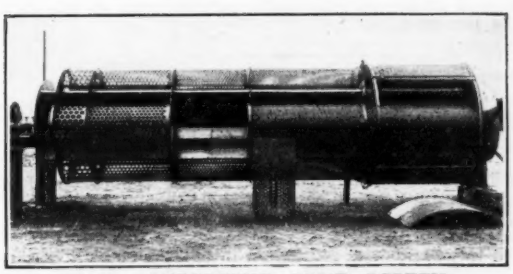


COKE SCREEN AND BUNKER.

COAL & COKE HANDLING PLANT OF ALL TYPES.

SELLING AGENTS FOR

POOL'S ROTARY COKE SCREENS.



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GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The anxiously awaited World Economic Conference commences this week. Its tasks will not be easy, and unfortunately since the date was fixed for the opening conditions the world over have become more complex. It is earnestly hoped, however that solutions will be found for some if not all of the pressing monetary and other problems. The Stock Exchange presented an irregular appearance throughout the week, and the volume of business was smaller than usual. There were one or two bright spots, particularly Home Rails, which advanced under the impetus of improved traffic returns.

Gas stocks and shares were only slightly affected by outside conditions, and although transactions were recorded in several instances at prices fractionally lower than the previous week, it will be seen in the Stock and Share List that very few quotations were marked down. The general tone of the market, however, remains firm, and it is a satisfactory feature that since the commencement of the year these stocks have not suffered by the uncertainty which has brought about such wide fluctuations in other sections. On the contrary, a large majority have appreciated, and the following table of some of the principal ordinary stocks gives an idea of the position:

—	Price Dec. 30.	Present Price.	Increase.
Alliance and Dublin	110	122	12
Barnet	137	159½	22½
Bournemouth 7%	150	159½	9½
Brighton 5%	129½	143½	14
Bristol	109*	113*	4
British	144½	149½	5
Cardiff	112½	121½	9
Commercial	112½	114½	2
Croydon sliding-scale	141½	147½	6
European	124½	130½	6
Gas Light units	25s.	25s. 6d.	6d.
Imperial Continental	203	210	7
Liverpool	120*	126*	6
Newcastle units	23s 6d.*	25s.*	1s. 6d.
Portsmouth 4%	155	163½	8
Sheffield	113½*	125*	11½
South Metropolitan	123½	126	2½
South Suburban	120½	126½	6
Southampton	104½	109½	5
Tottenham	133½	144½	11
Wandsworth	140½	147½	7

* Quotations at the local Exchanges.

The Directors of the Plymouth and Stonehouse Gas Light and Coke Company have recommended a final dividend for the half-year to March 31 last of 4% on the ordinary stock, making 8% for the year. This rate has been paid since the year 1928-29, and the yield at the current middle market price of 162 works out at £4 18s. 9d.%.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *June* 12.

There is very little change to report in the tar products market. Prices are steady at about the following levels:

Pitch, 85s. per ton f.o.b.

Creosote, 3d. per gallon.

Refined tar, 4d. to 4¼d. per gallon in bulk at makers' works.

Pure benzole is about 1s. 9d.; solvent naphtha, 95/160, about 1s. 7d.; pure toluole, about 2s. 4d.; and 90/140 pyridine bases, about 3s. 9d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

June 12.

The average prices of gas-works products during the week were: Gas-works tar, 32s. 6d. to 37s. 6d. Pitch—East Coast, 80s. to 82s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 80s. to 82s. 6d.* Toluole, naked, North, 1s. 9d. to 1s. 10d. Coal-tar crude naphtha, in bulk, North, 6d. to 6¼d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North, 10d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2d. to 2½d.; low gravity, 1¾d.; Scotland, 2d. to 2¼d. Heavy oils, in bulk, North, 4d. to 4½d. Carbolic acid, 60's, 2s. 9d. to 2s. 10d. Naphthalene, £9 to £10. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *June* 10.

Throughput continues on a fair scale, particularly in road tar, which is in large demand during the present favourable weather conditions.

Crude gas-works tar.—The actual value is 42s. 6d. to 47s. 6d. per ton *ex* works.

Pitch.—Distillers are awaiting developments before selling for delivery next season. Meantime export price is nominal at round 75s. to 77s. 6d. per ton f.o.b. Glasgow. Home quotations average 75s. per ton *ex* works in bulk.

Refined tar to Ministry of Transport Specification is in large demand, and value is unchanged at 3½d. to 3⅝d. per gallon f.o.r. naked, according to quantity.

Creosote oil.—Distillers are maintaining quotations although stocks are high. B.E.S.A. Specification is 2¼d. to 2⅜d. per gallon; low gravity, 2d. to 2¼d. per gallon; and neutral oil, 2¼d. to 2⅜d. per gallon—all in buyers' rail tanks *ex* works.

Cresylic acid is in better call, and the position is, if anything, steadier. Pale, 97/99%, is 10d. to 11d. per gallon; dark, 97/99%, 9d. to 10d. per gallon; and pale, 99/100%, 1s. 1d. to 1s. 2d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha is unchanged at 4d. to 4½d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—Supplies are not plentiful. 90/160 grade is 1s. 2½d. to 1s. 3½d. per gallon; and 90/190 grade 11d. to 1s. per gallon *ex* works.

Motor benzole.—Production is low with price firm at 1s. 3d. to 1s. 4d. per gallon *ex* works in bulk.

Pyridines.—90/160 grade is 3s. to 3s. 3d. per gallon, and 90/140 grade 3s. 3d. to 3s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	9	to	0	9½	per gallon at works
Motor "	1	4	"	1	4½	" " "
Pure "	1	7½	"	1	8	" " "

Contracts Advertised To-Day.

Coal.

Bakewell Urban District Council. [p. 824.]

New Capital Issues.

Reading Gas Company.—The Directors of the Reading Gas Company invite tenders not later than June 26 for £45,000 of 4% debenture stock in the Company, at a minimum price of par, in multiples of £10 or multiples thereof. Further details of this issue are given in our advertisement columns.

Yeadon and Guiseley.—The Yeadon and Guiseley Gas Company recently issued by tender £3000 "B" stock, the dividend on which is at the rate of £8 15s.%. Tenders were received for £14,760 stock at prices ranging from £150 to £170 per £100. The lowest accepted tender was at £165 per £100, and the average price obtained was £166 16s. 8d. per £100. The total amount realized by the issue was £5005.

Gosport District Gas Company.—Messrs. Llewellyn Puttock & Blake, of 123, High Street, Gosport, are instructed to sell by Public Auction on June 20, at the Gosport Estate Sale Rooms, £5000 of 4% perpetual debenture stock and £10,000 of 5% perpetual preference stock in the Gosport District Gas Company in lots of £20, £50, and £100. Particulars will be forwarded upon application to the Auctioneers.

Gas Acts (1920 and 1929) Orders.

SPECIAL ORDERS.

Cirencester Gas Company, Ltd.

To extend the limits of supply so as to include the parishes of Baunton and Preston, in the County of Gloucester; to make provisions as to the price of gas; and to authorize the use of scheduled lands for gas purposes.

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. June 10. (Provincial Exchanges June 9.)	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Apl. 3	7⅜	7	Alliance & Dublin Ord. ...	117—127	...	120½—122½
374,000	,,	Jan. 9	4	4	Do. 4 p.c. Deb. ...	85—95	...	...
557,655	,,	Mar. 6	7	7	Barnet Ord. 7 p.c.	157—162	...	159—161
300,000	1	May 8	1/4⅛	1/9⅛	Bombay, Ltd.	25/—27/-	...	25/9—26/-
178,280	Stk.	Feb. 20	9½	9½	Bournemouth sliding scale	195—205	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	157—162	...	...
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	137—142	...	137
50,000	,,	Dec. 19	3	3	Do. 3 p.c. Deb. ...	75—80	...	...
162,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	101—106	...	...
210,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	122—127	...	...
357,900	,,	Mar. 6	7½	7½	Brighton, &c. 6 p.c. Con. ...	152—157	...	...
540,000	,,	,,	6⅔	6⅔	Do. 5 p.c. Con. ...	141—146	...	...
195,500	,,	,,	6	6	Do. 6 p.c. B Pref.	134—137	...	...
1,487,500	,,	Mar. 6	5	5	Bristol 5 p.c. max.	112—114*a*	...	...
120,420	,,	Dec. 19	4	4	Do. 1st 4 p.c. Deb. ...	100½—101½*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100½—101½*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	120—124*a*	...	...
855,000	,,	Apl. 3	7	8	British Ord.	147—152	...	149½—150
100,000	,,	Dec. 19	7	7	Do. 7 p.c. Pref.	147—152	...	...
350,000	,,	,,	—	5½	Do. 5½ p.c. Pref. ...	105—110	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	105—115	...	...
160,000	,,	Jan. 9	5	5	Cambridge 5 p.c. Deb. ...	117—122	...	...
100,000	10	May 22	6	4	Cape Town, Ltd.	7—8*	...	7—7⅛
100,000	10	Apl. 24	4½	4½	Do. 4½ p.c. Pref. ...	6—7	...	...
150,000	Stk.	Dec. 19	4½	4½	Do. 4½ p.c. Deb. ...	88—93	...	...
626,860	,,	Feb. 20	6	6	Cardiff Con. Ord.	119—124	...	...
237,860	,,	Jan. 9	2⅜	5	Do. 5 p.c. Red. Deb.	105—110	...	...
157,150	,,	Feb. 20	5	6½	Chester 5 p.c. Ord.	105—110½	...	...
98,936	1	May 22	2/-	2/-	Colombo, Ltd. Ord.... ...	25/—30/*	...	...
24,500	1	,,	1/4⅛	1/4⅛	Do. 7 p.c. Pref. ...	18/6—20/6*	...	...
609,204	1	Mar. 20	-/11'48	-/11'48	Colonial Gas Assn. Ltd. Ord.	17/—19/-	...	...
296,053	1	,,	1/8'30	1/8'30	Do. 8 p.c. Pref.	20/—22/-	...	...
1,796,955	Stk.	Feb. 20	5	6½	Commercial Ord.	112—117	...	115½
475,000	,,	Dec. 19	3	3	Do. 3 p.c. Deb. ...	75—80	...	...
265,272	,,	Mar. 6	—	5	Do. 5 p.c. Deb. ...	120—125	...	...
807,560	,,	Feb. 20	7	7	Croydon sliding scale ...	145—150	...	...
469,590	,,	,,	5	5	Do. max. div.	101—106	...	...
500,000	,,	Jan. 9	5	5	Do. 5 p.c. Deb.	120—125	...	124½
542,270	,,	Mar. 6	7	10	Derby Con.	150—160*c*	...	...
55,000	,,	Jan. 9	4	4	Do. 4 p.c. Deb.	80—85*c*	...	...
209,000	,,	Mar. 6	5	5	East Hull Ord. 5 p.c. ...	106—111	...	...
179,500	,,	Mar. 6	6	6	East Surrey Ord. 5 p.c. ...	120—125	...	...
155,019	,,	Dec. 19	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
1,002,180	,,	Apl. 3	†5	†7	European, Ltd.	128—133	−2	130—130½
19,373,992	,,	Feb. 20	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	25/—26/-*f*	...	25/7½—25/10½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	85—88	−1	86—87
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	99—102	...	100½—101½
6,102,497	,,	Dec. 19	3	3	Do. 3 p.c. Con. Deb. ...	77—80	−½	77½—79½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	114—117	−1	116
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	111—114	−1	112—113½
270,466	,,	Mar. 6	6	6	Harrogate New Cons. ...	113—118	...	...
82,500	,,	Mar. 6	7	7	Hastings & St. L. 5 p.c. Conv.	138—143	...	...
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	110—115	...	112½
70,000	10	Apl. 24	†10	†10	Hongkong & China, Ltd. ...	14—15	...	...
218,200	Stk.	Mar. 6	6	6	Hornsey Con. 3½ p.c. ...	122—127	...	...
5,600,000	,,	May 22	10	14	Imperial Continental Cap.	205—215*	...	207½—211½
223,130	,,	Feb. 6	3½	3½	Do. 3½ p.c. Red. Deb.	89—94	...	...
235,242	,,	Mar. 6	2½	2½	Lea Bridge 5 p.c. Ord. ...	170—175	...	...
2,145,907	,,	Mar. 6	6	6	Liverpool 5 p.c. Ord. ...	125½—126½*b*	...	...
245,500	,,	Dec. 19	5	5	Do. 5 p.c. Red. Pref. ...	105—115*b*	...	...
306,088	,,	Jan. 19	4	4	Do. 4 p.c. Deb. ...	101—103*b*	...	...
165,786	,,	Feb. 20	8	10	Maidstone 5 p.c. Cap. ...	180—200	...	...
56,176	,,	Dec. 19	3	3	Do. 3 p.c. Deb. ...	70—75	...	...
75,000	5	Dec. 5	†10	†10	Malta & Mediterranean ...	9—11	...	10 7/16
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb. ...	98—103	...	...
231,978	Stk.	Mar. 6	5	5	M. S. Utility "C." Cons. ...	103—108	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	93—98	−2	94½—96⅞
112,126	,,	Jan. 9	4	4	Do. 4 p.c. Deb. ...	102—104	...	...
148,955	,,	,,	5	5	Do. 5 p.c. Deb. ...	115—120	...	...
675,000	,,	21 May '31	16	16	Montevideo, Ltd.	50—60	...	...
2,061,315	,,	Mar. 6	5	5½	Newcastle & Gateshead Con.	24/6—25/6*d*	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	100—101*d*	...	...
776,706	,,	Jan. 9	3½	3½	Do. 3½ p.c. Deb. ...	91—93*d*	...	...
277,285	,,	May 8	5	5	Do. 5 p.c. Deb. '48...	107—109*d*	...	...
274,000	,,	Feb. 20	5	5	Newport (Mon.) 5 p.c. max.	100—102*a*	...	...
204,940	,,	Mar. 20	7½	7½	North Middlesex 6 p.c. Con.	132—142	...	...
396,160	,,	Feb. 6	5	5	Northampton 5 p.c. max. ...	103—108	...	...
300,000	,,	Apl. 24	9	7	Oriental, Ltd.	114—119	...	116—117
316,617	,,	Dec. 19	8	8	Plym'th & Stonehouse 5 p.c.	157—167	...	...
504,416	,,	Feb. 20	8	8	Portsm'th Con. Stk. 4 p.c. Std.	161—166	...	165
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	104—109	...	...
114,000	,,	Feb. 20	5	5	Preston 5 p.c. Pref.	103—108	...	...
686,312	,,	Jan. 23	4	4	Primitiva 4 p.c. Rd. Db. 1911	80—85	...	83—84
389,813	,,	Dec. 19	4	4	Do. 4 p.c. Cons. Deb.	80—85	...	...
150,000	10	Mar. 20	6	6	San Paulo 6 p.c. Pref. ...	6⅞—7⅛	...	...
1,736,968	Stk.	Sept. 5	6	6	Sheffield Cons.	123—127*e*	+2	...
95,000	,,	Jan. 9	4	4	Do. 4 p.c. Deb.	91—95*e*	...	...
133,201	,,	Feb. 20	8½	5	Shrewsbury 5 p.c. Ord. ...	125—130	...	...
90,000	10	6 June '32	15	15	South African	3—5	...	...
6,709,895	Stk.	Feb. 20	5	7	South Met. Ord.	124—128	...	124½—126
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	136—141	...	138½
850,000	,,	,,	—	20/-*g*	Do. 4 p.c. Irred. Pf.	99—103	...	...
1,895,445	,,	Jan. 9	3	3	Do. 3 p.c. Deb. ...	77—80	−½	77¼—80½
1 000,000	,,	Jan. 23	5	5	Do. 5 p.c. Red. Deb.	114—117	...	114—115
209,820	,,	Mar. 6	8½	8½	South Shields Con.	147½—152½*d*	...	...
1,543,795	,,	Feb. 20	6	6	South Suburban Ord. 5 p.c.	124—129	...	125—127½
300,000	,,	,,	5	5	Do. 5 p.c. Pref.	113—118	...	...
868,837	,,	Dec. 19	5	5	Do. 5 p.c. Deb.	120—125	...	124½
647,740	,,	Feb. 20	5	5	Southampt'n Ord. 5 p.c. max.	107—112	...	...
121,275	,,	Dec. 19	4	4	Do. 4 p.c. Deb.	100—105	...	...
350,000	,,	Mar. 6	9/-	5½	Swansea 5½ p.c. Red. Pref.	108—112	...	...
200,000	,,	Dec. 19	6½	6½	Do. 6½ p.c. Red. Deb.	105—110	...	...
1,076,490	,,	Mar. 6	6⅔	6⅔	Tottenham and District Ord.	142—147	...	142
300,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	123—128	...	124
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	110
199,005	,,	Dec. 19	4	4	Do. 4 p.c. Deb. ...	98—103	...	...
85,701	,,	Apl. 3	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	80—85	...	...
347,769	,,	Mar. 6	7	7	Uxbridge, &c., 5 p.c. ...	140—145	...	...
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
1,322,220	,,	Mar. 6	7	7	Wandsworth Consolidated	145—150	...	146—147
1,096,373	,,	,,	5	5	Do. 5 p.c. Pref.	112—117	...	113½
1,317,964	,,	Dec. 19	5	5	Do. 5 p.c. Deb.	120—125	...	122¼—122½
158,400	,,	Mar. 6	5	6A	Winchester W. & G. 5 p.c. Con.	109—114	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g.*—For quarter. *h.*—Paid £3, including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year.

STOCKS AND SHARES FOR SALE.

READING GAS COMPANY.
(Incorporated by Special Acts of Parliament.)

SALE BY TENDER OF

£45,000

4 PER CENT. DEBENTURE STOCK.

Minimum Price, Par.

THE Directors of the Reading Gas Company invite TENDERS, not later than Monday, 26th June, 1933, for the above STOCK, in amounts of £10 or multiples thereof.

The Stock will be issued at the option of the Purchaser as a PERPETUAL DEBENTURE STOCK, or as a REDEEMABLE DEBENTURE STOCK. The Redeemable Debenture Stock will be redeemed at Par on the 1st July, 1955, or, at the Company's option, at any time during the preceding ten years upon three months' notice from the Company.

The Stock will be allotted to those tendering the highest prices, and in the event of Tenders exceeding the amount of Stock offered, a *pro rata* allotment will be made in respect of Tenders at the lowest price accepted.

Tenders must be accompanied by a deposit of 10 per cent. of the nominal amount of Stock applied for, and the balance of the purchase money is payable on or before Monday, 10th July, 1933.

The Stock will be registered in the Company's books in the names of the Purchasers or their Nominees free of expense, and will be transferable by Deed in the usual way after the 10th July, 1933, or as soon as the purchase money shall have been paid.

Interest will accrue from the 1st July, 1933, and will be payable half-yearly on the 1st January and 1st July; the first payment will be made on the 1st January, 1934.

Forms of Tender may be obtained from the undersigned.

By Order of the Directors,
A. B. STEDMAN,
Secretary.

159, Friar Street,
Reading,
June 6, 1933.

TO INVESTORS, CAPITALISTS, AND SPECULATORS.

On Tuesday, 20th June, at 6.30 p.m.

SALE BY PUBLIC AUCTION OF

£15,000

GOSPORT DISTRICT GAS STOCK

At Gosport Estate Sale Rooms.

LLEWELLYN Puttock & Blake are instructed to SELL BY PUBLIC AUCTION, as above,

£5000 4% PERPETUAL DEBENTURE STOCK,
£10,000 5% PERPETUAL PREFERENCE STOCK,

In Lots of £20, £50, and £100,

Free of any expenses to Purchasers.

Printed Particulars will be forwarded free upon application to the Auctioneers, LLEWELLYN PUTTOCK & BLAKE, 123, HIGH STREET, GOSPORT.

COMPANY NOTICES.

WINCHESTER WATER AND GAS COMPANY.

NOTICE is Hereby Given that the 4 PER CENT. and 5 PER CENT. IRREDEEMABLE DEBENTURE STOCK REGISTERS of the Company WILL BE CLOSED from the 23rd day of June, 1933, to the 30th day of June, 1933, both days inclusive.

By order of the Board,
W. D. WALKER,
Secretary.

90, High Street,
Winchester,
June, 1933.

BARNET DISTRICT GAS AND WATER COMPANY.

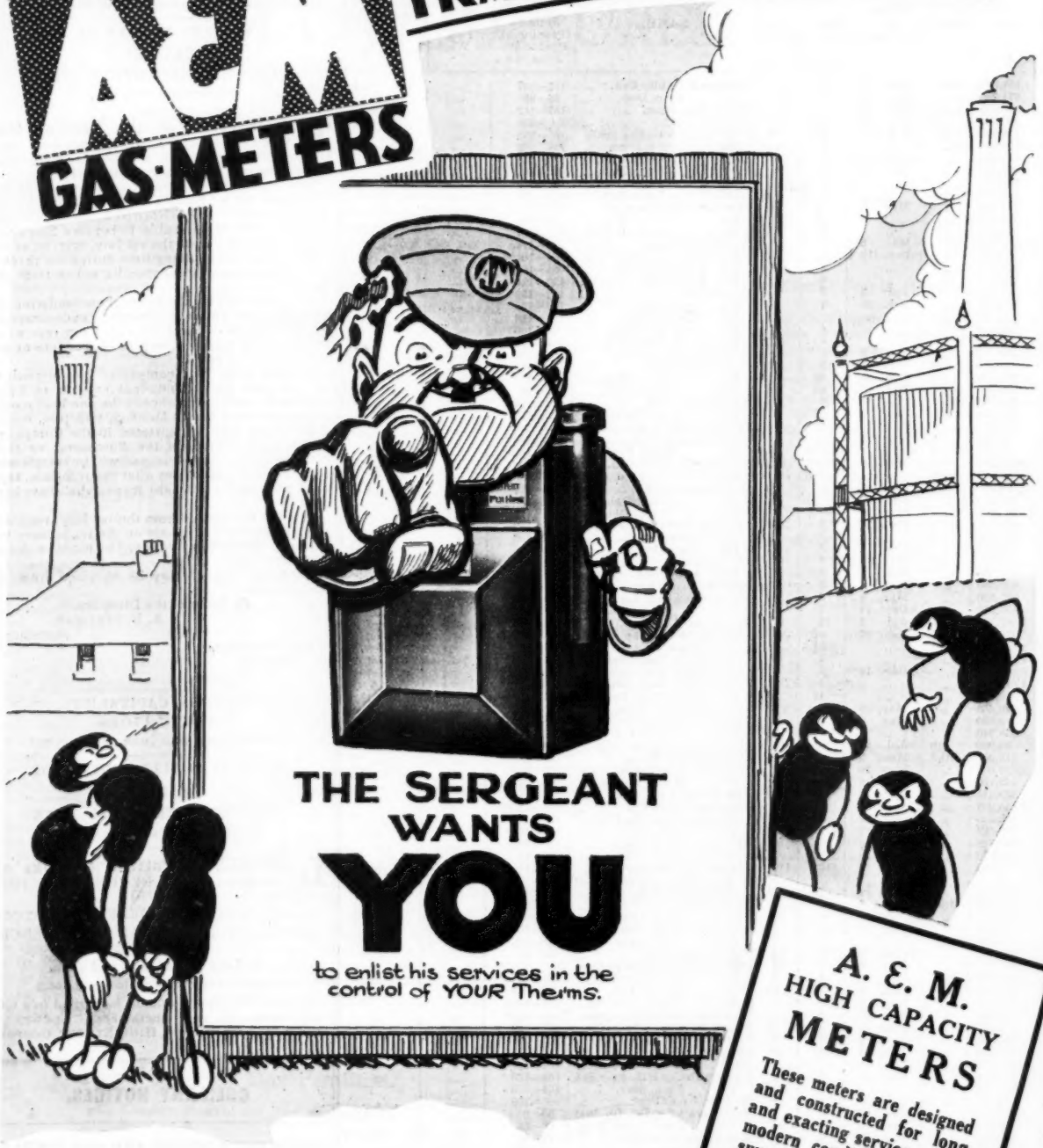
NOTICE is Hereby Given that the TRANSFER BOOKS of this Company relating to DEBENTURE STOCK WILL BE CLOSED on the 24th June, 1933, and RE-OPENED on the 1st July, 1933.

By order of the Board,
E. D. DAVEY,
Secretary.

Offices:
139, Cannon Street,
London, E.C. 4,
June 10, 1933.

A&M GAS·METERS

TRAIN·THE·THERMS



THE SERGEANT WANTS YOU

to enlist his services in the control of YOUR Therms.

A. E. M. HIGH CAPACITY METERS

These meters are designed and constructed for long and exacting service under modern conditions. Pressure losses at capacity are unusually small and registration is precise over a very large range.

The new Dual Coin P.P. mechanism is the acme of simplicity. One operation to the range plate is all that is required to alter from 1d. to 1/- setting, or vice versa.

Ask for a sample of the new 100 cu. ft. Dual Coin P.P.

WILL YOU JOIN?

There is room in the ranks of A.E.M. customers for new recruits. Will you accept service? Sergt. A.E.M. Meters is ready and willing to control your Therms. His initial "E" stands for Efficiency. Join now!

ALDER & MACKAY LIMITED

MAKE METERS OF METICULOUS MEASUREMENT

ALDER & MACKAY LTD., EDINBURGH, LONDON & BRANCHES.

PUBLISHERS' NOTICE.

TO CORRESPONDENTS: No notice can be taken of anonymous communications, unless authenticated by the name and address of the writer (not necessarily for publication).

TO ADVERTISERS.

NOON ON TUESDAY is the latest hour for receipt of advertisement copy for the following day's issue.

FIRST POST ON MONDAY is the latest for receipt of alterations of standing advertisements.

RATES FOR UNDISPLAYED ADVERTS: Situations Wanted, Six Lines and under (about 36 words), 3s.; each additional Line, 6d. Situations Vacant, Apparatus Wanted and for Sale, Contracts, Public Notices, &c., 9d. per Line—minimum 4s. 6d. An additional charge of 6d. is made where replies are addressed c/o the "JOURNAL."

Full Schedule of Advertising Rates on application.

TERMS OF SUBSCRIPTION.

United Kingdom and Ireland — Advance Rate: 35/- per annum, 18/- per half year. Credit Rate: 40/- per annum, 21/- per half year.

Dominions and Colonies ... 35/- per annum, in advance.

United States (through United States Agent) } $8.50 per annum, in advance.

Other Countries in the Postal Union. } 40/- per annum, in advance.

A copy of the "G.J." Calendar and Directory is presented to Continuous Subscribers.

UNITED STATES.—Renewals after December, 1931, and all new subscriptions in the United States, to be made through ROBERT O. LUQUEER, Agent, WOOLWORTH BUILDING, NEW YORK, N.Y.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C. 4.
Telephone: Central 2236-7 (2 lines). Telegrams: "GASKING, FLEET LONDON."

FRESH OXIDE

SPENT OXIDE

GAS PURIFICATION & CHEMICAL COMPANY LIMITED,

PALMERSTON HOUSE,
34, OLD BROAD STREET,
LONDON, E.C. 2.

(ESTABLISHED 1873.)

Telegrams: "PURIFICATION, STOCK, LONDON."
Telephone: LONDON WALL 9144.

J & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E. 1.

WET AND DRY GAS METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.

REPAIRS RECEIVE PROMPT ATTENTION.

Telephones:
Main (Oldham) 3815/6 and 2412 Hop, London.

Telegrams:
"BRADDOCK, OLDHAM," and "METRIQUE, LAMB, LONDON."

WEIGHBRIDGES

FOR Motor Lorries and Railway Traffic can be seen erected at our Works READY FOR DELIVERY. Inspection by your Engineer invited and a test by your Local Inspector of Weights and Measures before delivery. Every machine a High-Class Engineering Product and fully guaranteed.

CHARLES ROSS, LIMITED, SHEFFIELD.

OXIDE OF IRON.

SPENT OXIDE BOUGHT.

BALE & CHURCH, LTD.,
33, ST. MARY-AT-HILL, LONDON, E.C. 3.
Phone: Royal 1484.

"TORTO" FIRE CEMENT.

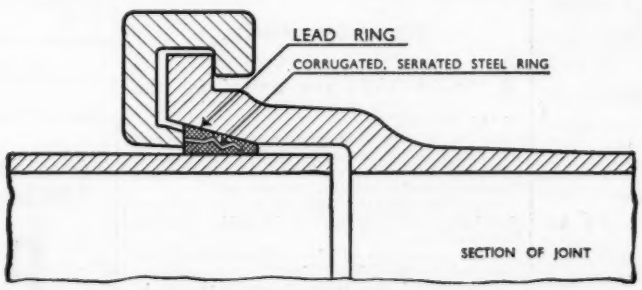
BALE & CHURCH, LTD.,
33, ST. MARY-AT-HILL, LONDON, E.C. 3.
Phone: Royal 1484.

"KLEENOFF," THE COOKER CLEANSER
Tins for Sale to Consumers.
In Bulk for Works Use.
(*See also the "Gas Salesman."*)

BALE & CHURCH, LTD.,
33, ST. MARY-AT-HILL, LONDON, E.C. 3.
Phone: Royal 1484.

The STANTON Mechanical Lead Joint

(Patent applied for)



NO INCREASED COST

This mechanically made joint works on a similar principle to the Stanton-Wilson Joint, but employs a lead ring in which is encased a thin corrugated, serrated steel ring. It is more flexible than a caulked joint and provides for expansion and contraction of mains—No skilled labour needed.

N.B.—Where a considerable degree of flexibility is required, use the Stanton-Wilson self-adjusting Joint, which has been adopted by over 200 Public Undertakings in this country.

The Stanton Ironworks Company Limited, Near Nottingham

ROBERT DEMPSTER & SONS, Ltd., ELLAND, Builders of CARBONIZING PLANTS, both Horizontal and Vertical. Manufacturers of CONDENSERS, PURIFIERS, GASHOLDERS, &c., also every description of COAL and COKE HANDLING PLANT. Telegrams: "DEMPSTER, ELLAND." Telephone: ELLAND 261 (Private Branch Exchange).

FIRTH BLAKELEY, SONS, & CO., LTD.,
Vulcan Ironworks, Church Fenton, Yorks.,
MANUFACTURERS of Gasholders, Tanks, Condensers, Purifiers, Scrubbers, Washers, and every description of Gas Plant.
Telegrams: "BLAKELEYS, CHURCH FENTON." Telephone: BARKSTON ASH 34 (Private Branch Exchange). Code: "BENTLEYS."

STEAM ENGINES FOR GAS WORKS
ASHWORTH & PARKER,
Riverside Works, Bury, Lancs.
(See illustrated advertisement June 7, p. 643.)

THE BRITISH GAS PURIFYING MATERIALS CO., LTD.,
99, LONDON ROAD, LEICESTER.
Telegrams: "BRIPURIMAT, LEICESTER." Telephone: LEICESTER 59086.

NATURAL BRITISH PURIFYING MATERIAL
AN ABSOLUTELY STANDARD PRODUCT.
MOISTURE GUARANTEED 28%
SUMMER AND WINTER.
"FIRST QUALITY" DUTCH BOG ORE
As supplied to most of the Principal Gas Works in Great Britain.
SPENT OXIDE PURCHASED.

THOMAS DUXBURY AND CO.
16, DRANSGATE, MANCHESTER. PALACE CHAMBERS, WESTMINSTER, S.W.1.
FOR
LUX
GAS PURIFYING MATERIAL.
Immediate delivery from STOCKS at:—
Grangemouth. Middlesbrough, Goole, London, Poole, Newport and Garston.
Quotations given for forward delivery.
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Telephones	*Telegrams:*
Manchester: Blackfriars 3268 & 3269.	Darwinian, Manchester.
London: Whitehall 6501.	Darwinian Parl, London.

GEORGE WILSON GAS METERS, Ltd.
for
GAS-METERS, ORDINARIES, SLOTS, AND REPAIRS
Foleshill Road, COVENTRY.
'Phone: 8655 Coventry. Grams: "GASMETER."
Cerium Works, Kingston Road, Raynes Park, LONDON, S.W. 20.
Radium Works, 11, Radium Street, Oldham Road, MANCHESTER.
(See advertisement last week, p. 689.)

PATENTS.

PATENTS for Inventions, Trade Marks "Advice Handbooks" and Consultations free. KING'S PATENT AGENCY LTD., Director B. T. KING, C.I.M.E., Regd. Patent Agent, G.B., U.S., and Can., 146A, QUEEN VICTORIA ST., E.C. 4, and 57, CHANCERY LANE (near Pat. Off.), LONDON, W.C. 2. 47 years' refs. 'Phone Cent. 0682.

MEWBURN, ELLIS, & CO.,
CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70 & 72, Chancery Lane, London, W.C. 2.
Telegrams: "Patent, London." 'Phone: 243 Holborn.
And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

EDUCATIONAL.

LEEDS UNIVERSITY.

Department of Coal Gas and Fuel Industries.

CORBET-WOODALL SCHOLARSHIP IN GAS ENGINEERING.

THE above-named Scholarship, of the value of £60 a year, and tenable at the University for a period of three years, with power of extension for a fourth year, is offered for competition by candidates desiring to enter the University in October, 1933, as Students of Gas Engineering. Candidates are required to submit their applications not later than June 26th to the CLERK TO THE SENATE, THE UNIVERSITY, LEEDS, from whom full particulars as to the conditions of award may be obtained. Applicants for the recently-advertised Cartwright Holmes Scholarship may also apply for this Scholarship.

THE UNIVERSITY OF LEEDS.

Department of Coal Gas and Fuel Industries.

WILLIAM CARTWRIGHT HOLMES SCHOLARSHIP.

THE above-named Scholarship, of the normal value of £120 a year, is offered for Competition by candidates desiring to enter the University in October, 1933, as Students of Gas Engineering. It is tenable at the University for a period of one, two, or three years, with power of extension for a fourth year, on the recommendation of the Senate to the William Cartwright Holmes Scholarship Committee, appointed by the Institution of Gas Engineers.

Attention is called to the eligibility for this Scholarship of graduates or other senior applicants of suitable training who desire to take a one or two years' course in Gas Engineering as provided in the Regulations of the University for the Diploma or Honours Degree in Gas Engineering.

Applicants for the recently-advertised Corbet-Woodall Scholarship may also apply for this Scholarship.

Full particulars may be obtained from the CLERK TO THE SENATE, THE UNIVERSITY, LEEDS, to whom applications should be addressed not later than June 26th.

APPOINTMENTS, &c., VACANT.

CITY OF NOTTINGHAM.

(GAS DEPARTMENT.)

APPLICATIONS are invited for the Appointment of a CONSUMERS' TECHNICAL ADVISER.

Applicants must have experience of Design and Working of Gas Furnaces for Central Heating and Industrial Purposes, and be capable of Advising Consumers and submitting Estimates.

Commencing Salary. £255 per Annum, rising to £350 by annual increments of £15 subject to satisfactory service.

The appointment will be subject to the Local Government and Other Officers' Superannuation Act, 1922, and the selected candidate will be required to pass a Medical Examination, and to take up residence in the City of Nottingham.

Applications, stating Age and Experience, and accompanied by Two recent Testimonials, should be sent to the undersigned not later than the 20th of June, 1933.

W. J BOARD,
Town Clerk.

The Guildhall,
Nottingham,
June 7, 1933.

REFRACTORY Manufacturer desires to appoint a TRAVELLER with Gas-Works Experience.
Address, No. 8322, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

CONTRACTS OPEN.

BAKEWELL URBAN DISTRICT COUNCIL.

TENDERS are invited for the Supply of GAS COAL, 1500 to 1800 Tons, delivered at Bakewell.

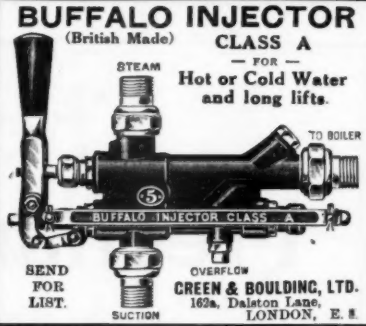
Forms of Tender and particulars can be obtained from the undersigned, to whom Tenders must be sent by June 29th, 1933.

V. R. COCKERTON,
Clerk to the Council.

Bakewell,
June 12, 1933.

HEMP GRUMMETS
Millions Sold Ask for Samples
A. WITHINSHAW
HELLIER STREET, DUDLEY, WORC.

TROTTER, HAINES, & CORBETT LIMITED
BRETTEL'S ESTATE
FIRE-CLAY & BRICK WORKS
STOURBRIDGE
Manufacturers of GAS RETORTS, GLASSHOUSE FURNACE & BLAST FURNACE BRICKS, LUMPS, TILES, and every Description of FIRE BRICKS.
Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.
LONDON OFFICE: E. C. BROWN & CO., LEADENHALL CHAMBERS, 4, ST. MARY AXE, E.C.

BUFFALO INJECTOR
(British Made) **CLASS A**
— FOR —
Hot or Cold Water and long lifts.


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GREEN & BOULDING, LTD.
162a, Dalston Lane, LONDON, E. 8.

CAST IRON PIPES
FOR
GAS, WATER, & STEAM
1¼in. to 12in. BORE.
THOS. ALLAN & SONS, LTD.,
Bonlea Foundry,
THORNABY-ON-TEES.
Telegrams: "BONLEA, THORNABY-ON-TEES."
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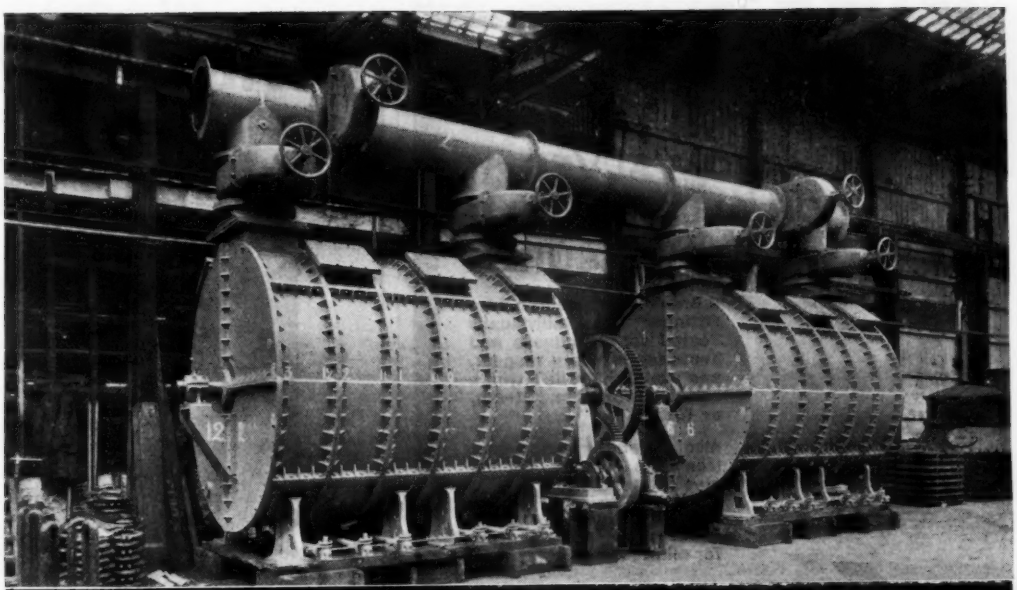

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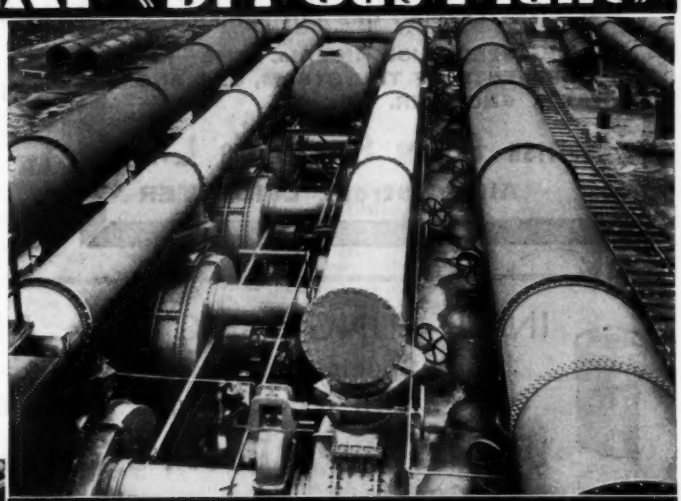

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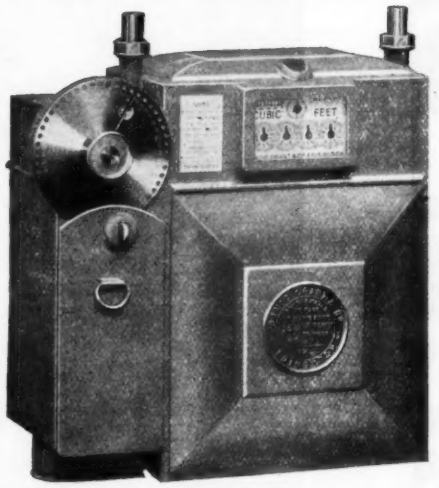

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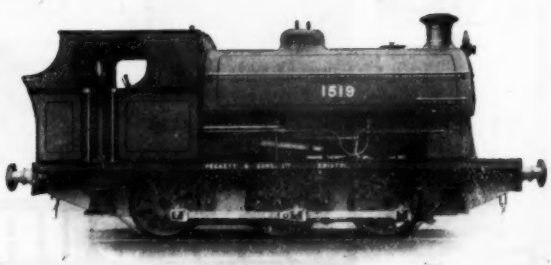

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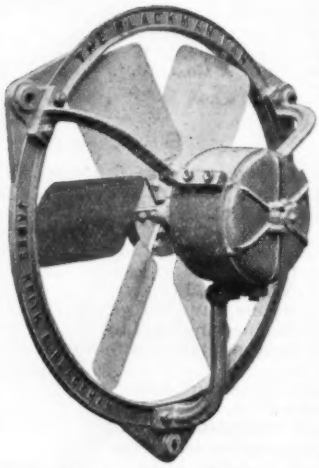

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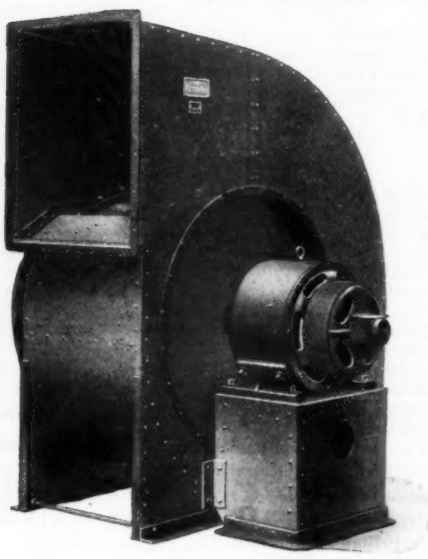

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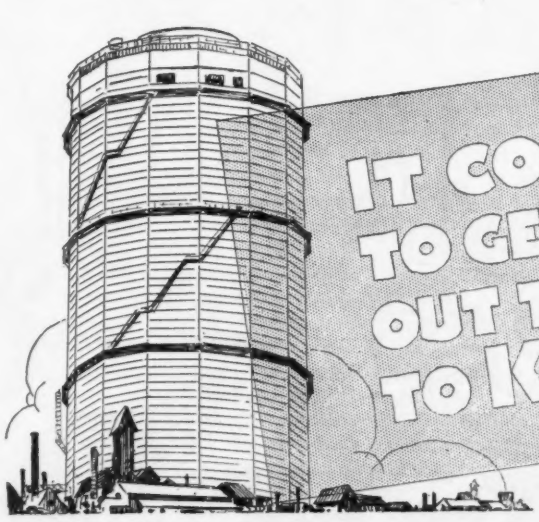

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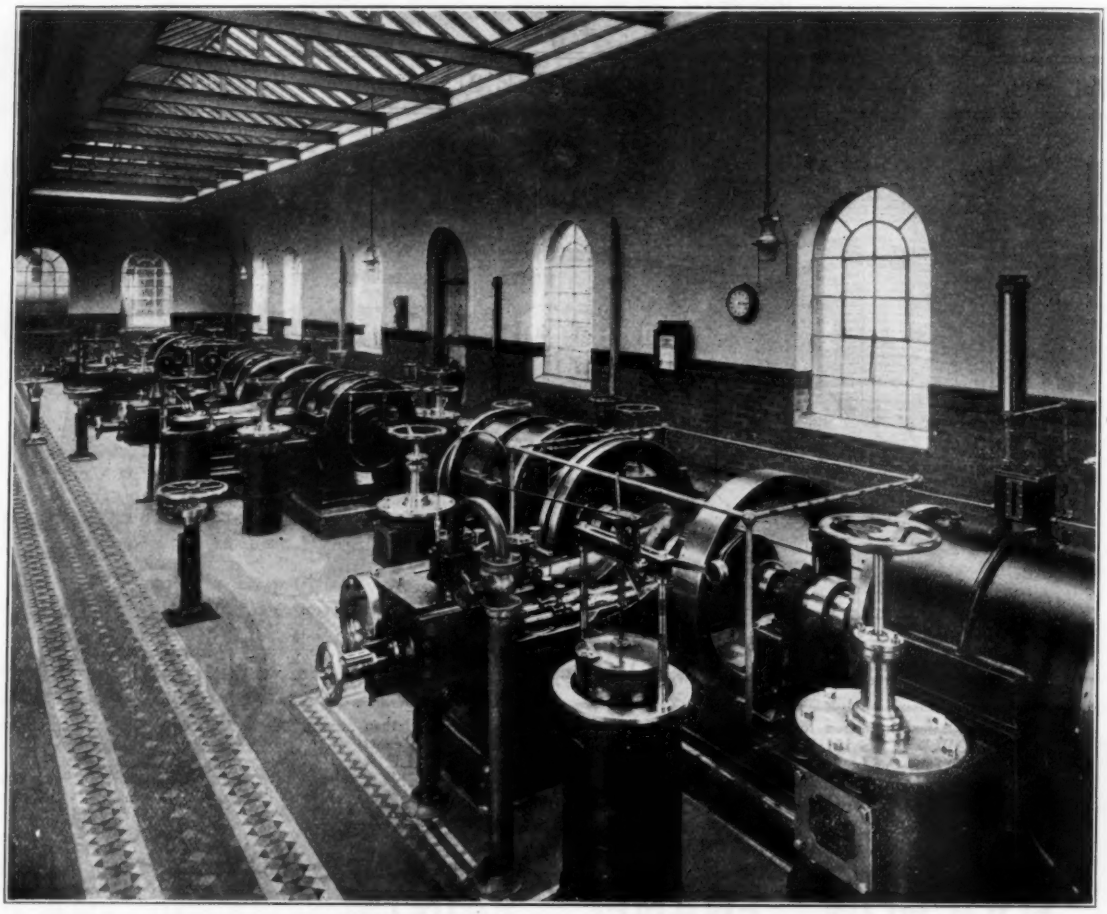

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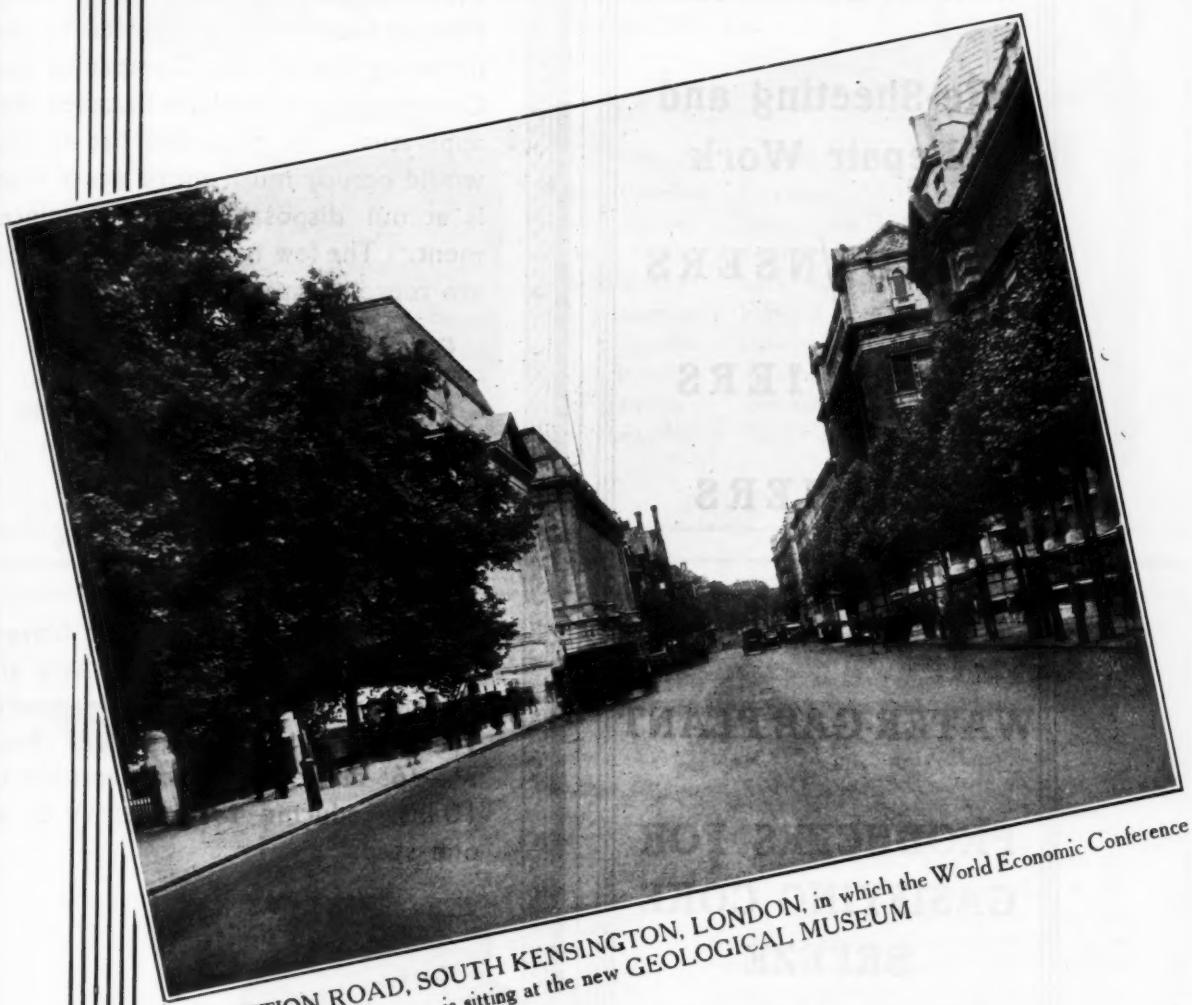

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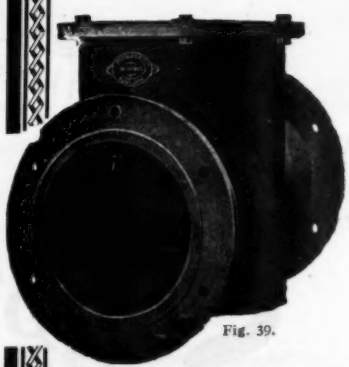

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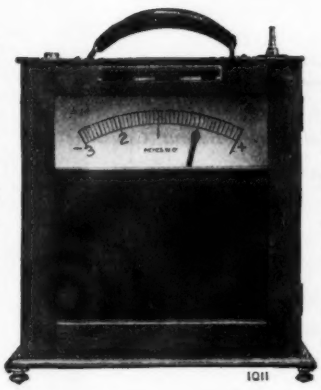

Fig. 1011.

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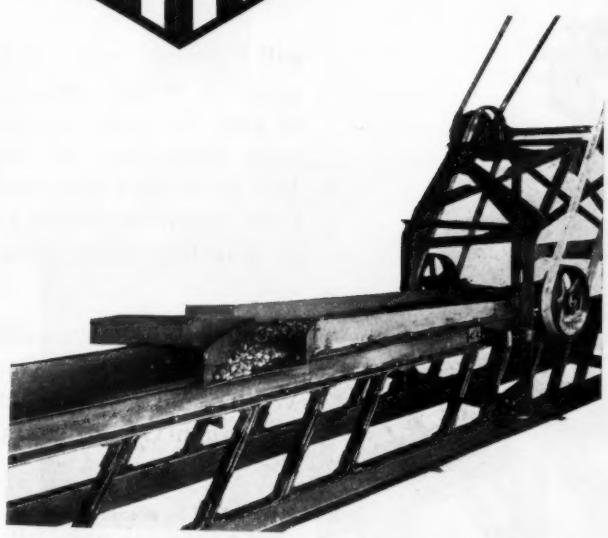

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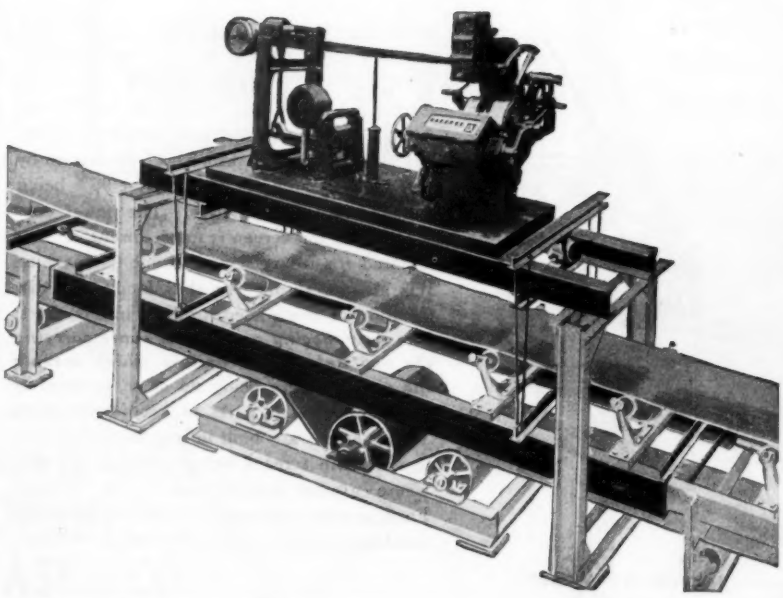
THE "BLAKE-DENISON" AUTOMATIC CONTINUOUS WEIGHER AND RECORDER



will furnish you with accurate weight records of coal or coke carried over Conveyors of the Belt or Bucket type, and thus enable leakages to be detected and stopped.

This machine is at work at many important Gas Works and Coke Ovens throughout Great Britain.

We shall be pleased to send you a Catalogue giving full information on request.

SAML. DENISON & SON LTD., HUNSLAKE, LEEDS

WE ARE ALSO MAKERS OF WEIGHBRIDGES, CRANE WEIGHERS, TESTING MACHINES, &c.

The "Berners"

Carving Table.

(GAS - HEATED)

The "Berners" gas heated Carving Table is constructed with mild steel body, having polished cast iron top, and is fitted with two carving wells and plain centre panel. The hot closet is fitted with sliding white enamelled doors, and has two perforated shelves, with burners at top and bottom, each separately controlled. Access for cleaning is provided by the robust cast iron legs on which the table is mounted. Body finish is Black Stove Dried, with polished mountings. Can be supplied in various sizes from 4 feet upwards, with carving wells and Bain Marie, or with plain top as required.

Manufactured by

FLETCHER RUSSELL

& Company Ltd.

4, Berners St., London, W. 1. Works, Warrington.

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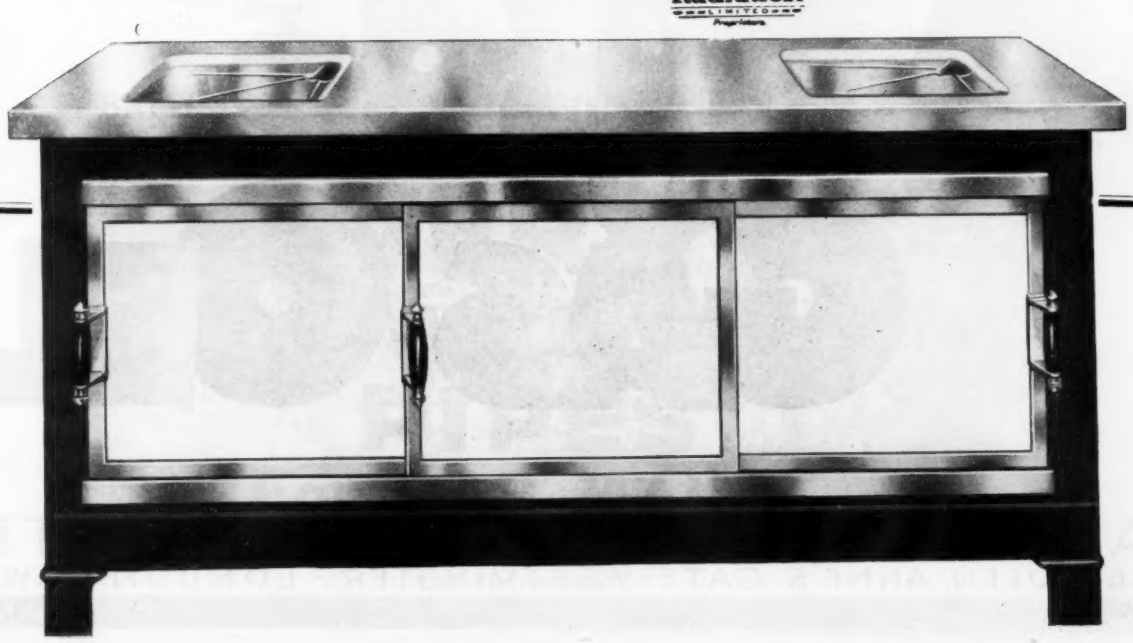
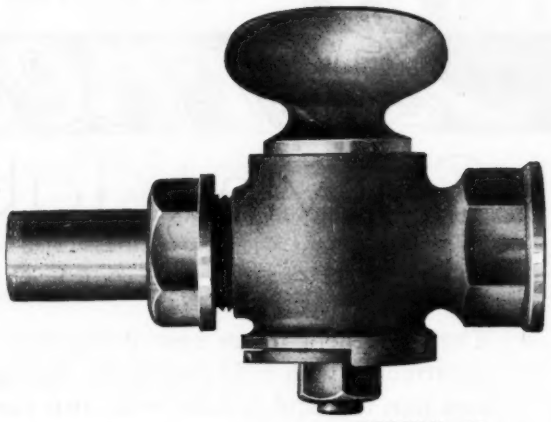


Quality



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GUN-METAL MAIN COCKS

GEORGE ORME & CO.
(Branch of Meters Ltd.)
ATLAS METER WORKS
OLDHAM

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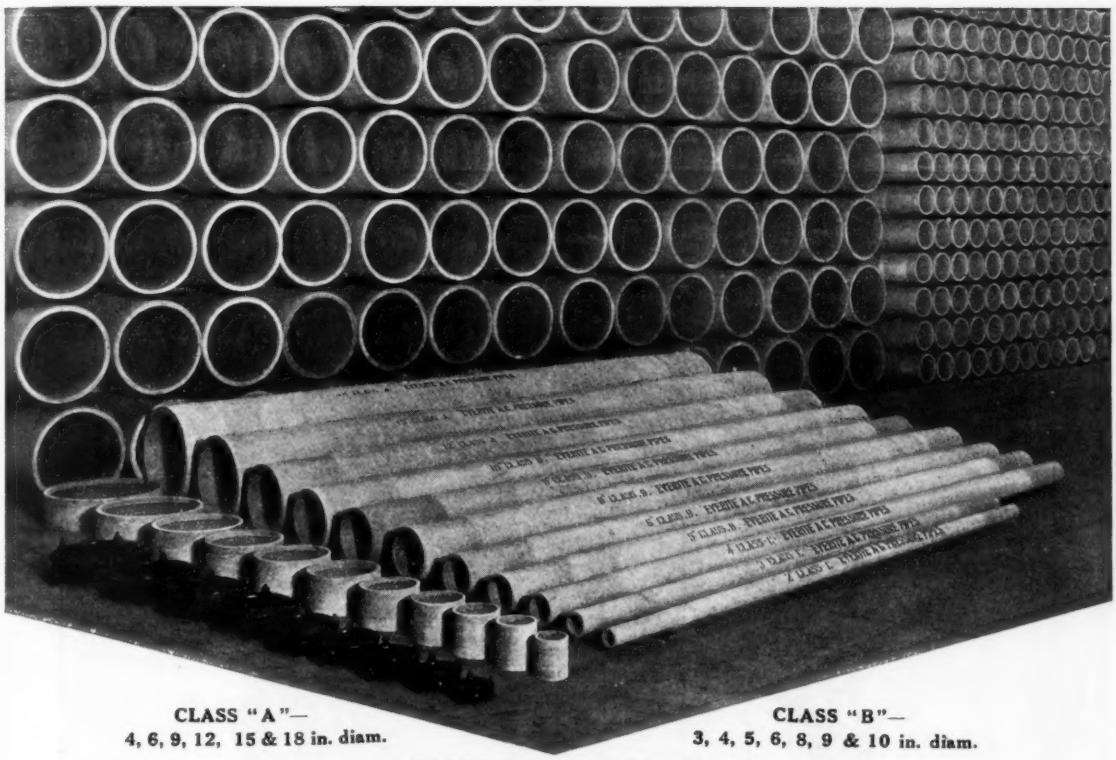

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4, 6, 9, 12, 15 & 18 in. diam.

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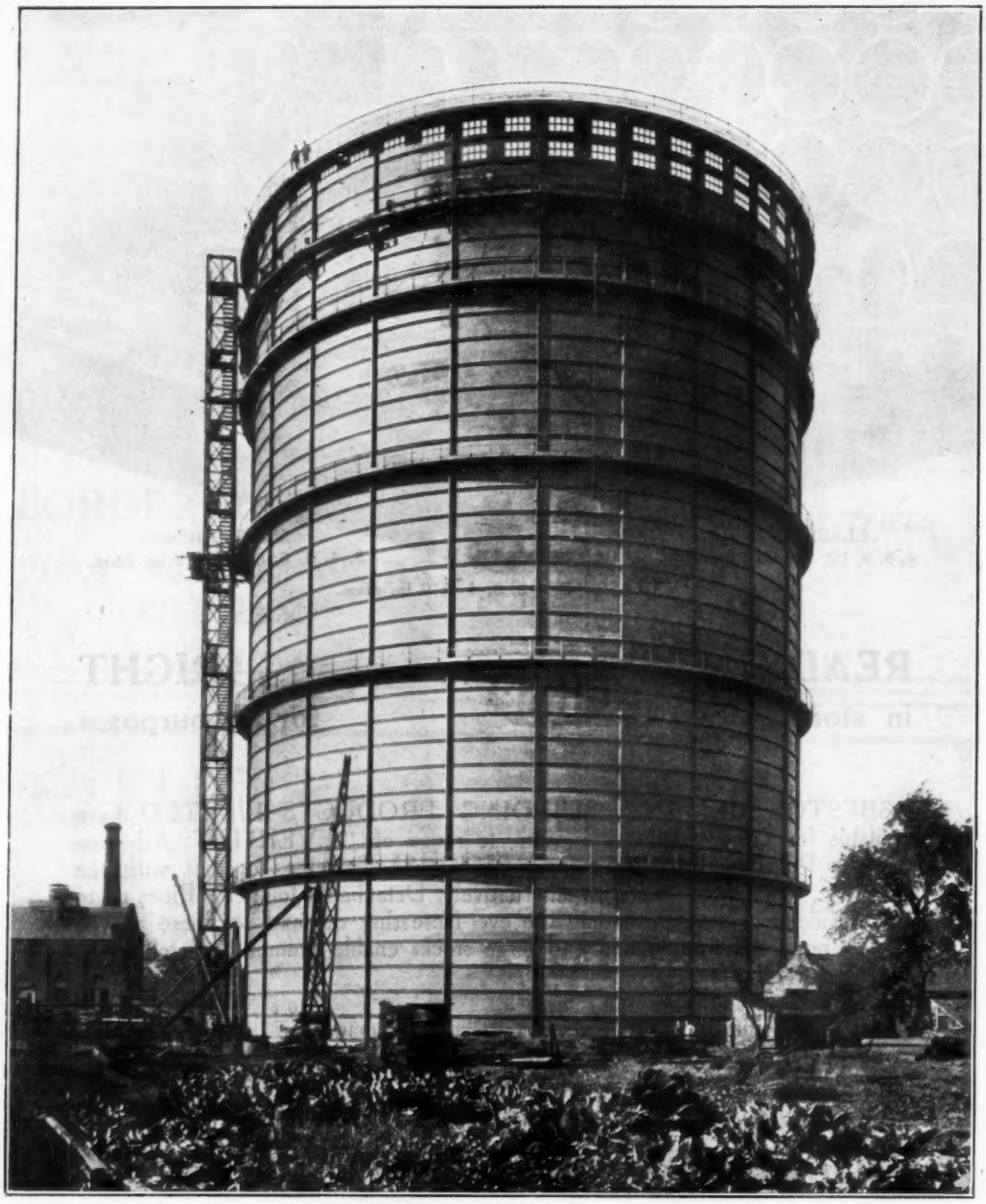
KLONNE WATERLESS GASHOLDERS



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GAS COOKER

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GREY MOTTLE AND WHITE ENAMEL FINISH AS SHOWN.

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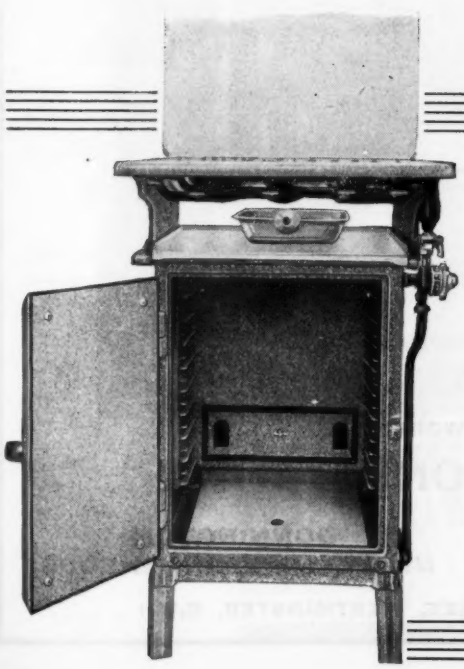

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Telephone: 3305 Burnley. Telegrams: Bluboilers Burnley.

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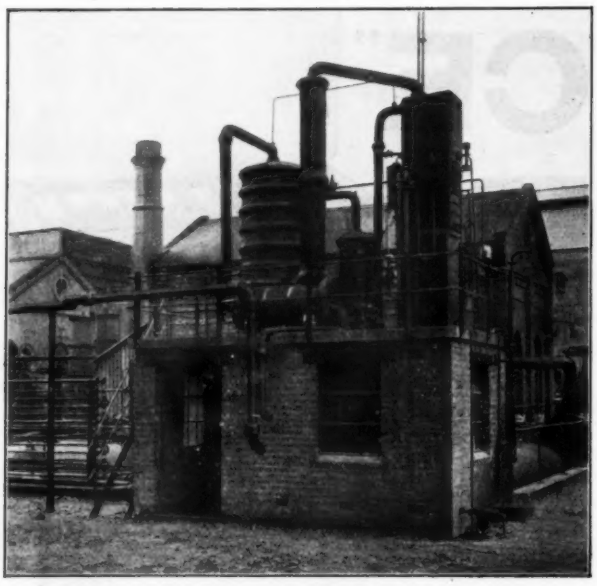
SIMON-CARVES BENZOLE PLANTS



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Main steam and water feeds on Simon-Carves Benzole plants are thermostatically controlled, thus only occasional attendance is required on the plant.

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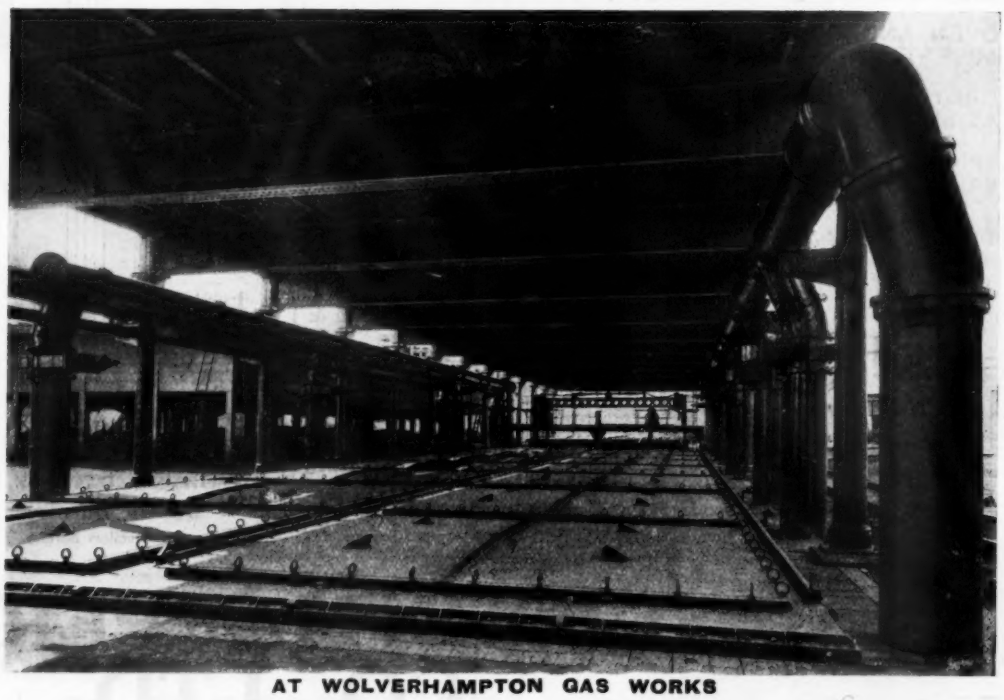

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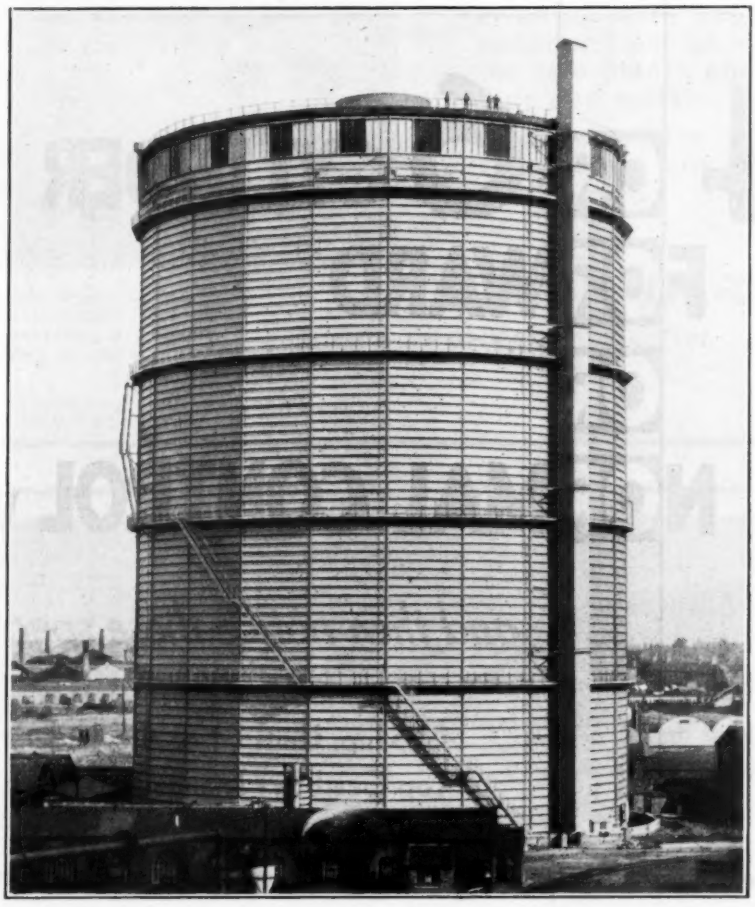
WATERLESS (M·A·N) GASHOLDERS

The Waterless Gasholder illustrated below exemplifies the speedy erection possible with this type, its adaptability to existing underground tanks, and the greatly increased capacity thereby obtainable without additional ground space.



This 4,000,000 cub. ft. M.A.N. Waterless Holder replaces a Telescopic Holder of only 1,000,000 cub. ft. capacity. Demolition of old Gasholder was commenced in January; concrete base over existing tank finished in April, and the new "Waterless" completed in November of same year.

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EFFICIENCY AND RELIABILITY

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THE MOORE GAS PLANT

140 THERMS PER TON
QUALITY — **400** B.Th.U.

Mechanically operated
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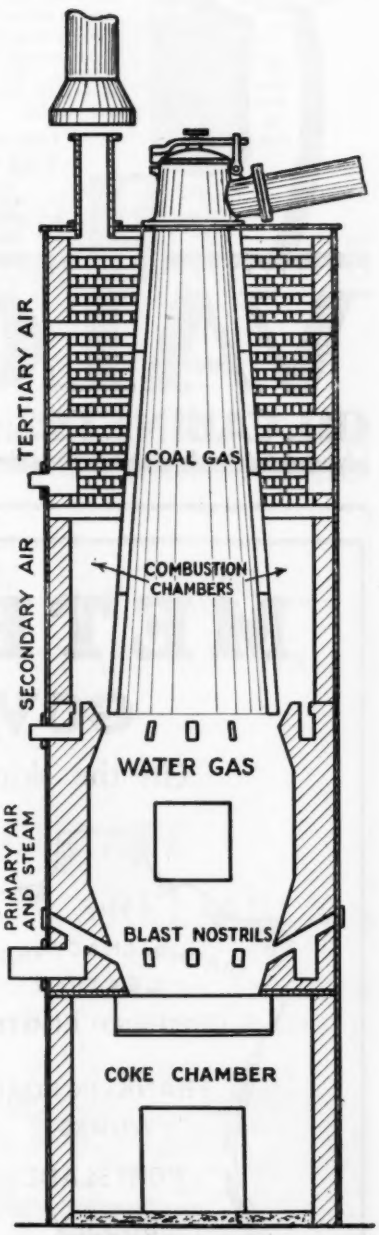

You need equipment which will operate efficiently at low cost.

The MOORE plant will increase the efficiency of your gas making and will reduce your depreciation and maintenance charges.

Full particulars on application to the sole licencees and manufacturers

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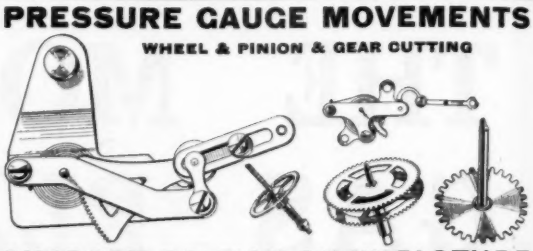

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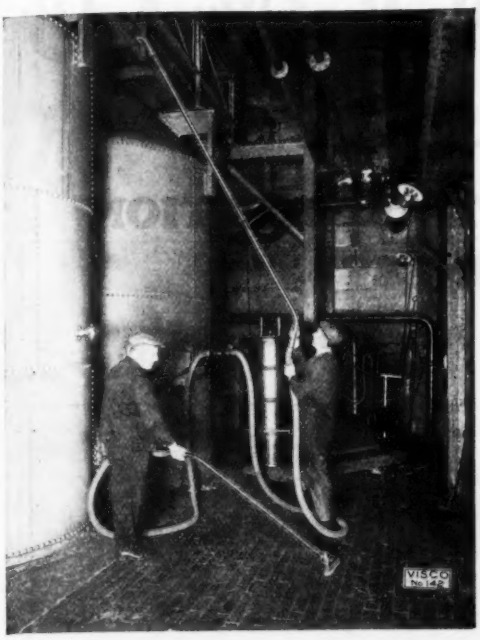

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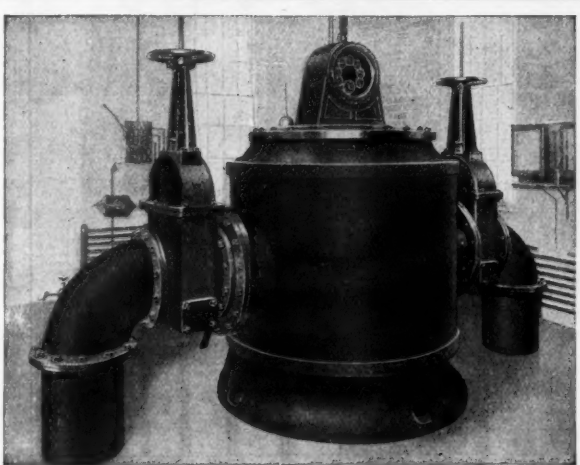

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MANCHESTER DISTRICT ASSOCIATION OF GAS ENGINEERS,

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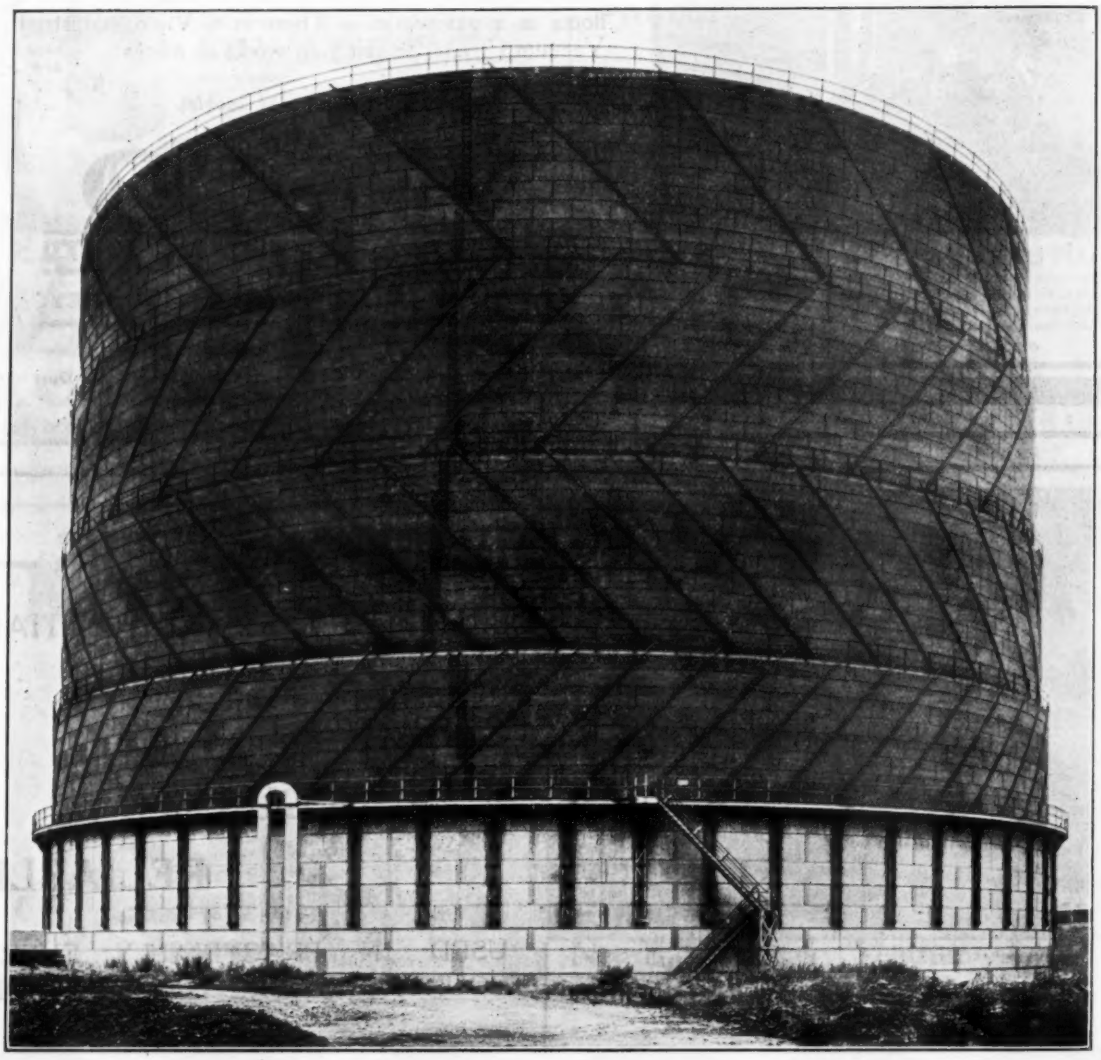

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Gasholder Lifts, 222 ft. 11 ins. to 213 ft. 5 ins. diameter × 35 ft deep.

Capacity : 5,000,000 cubic feet.

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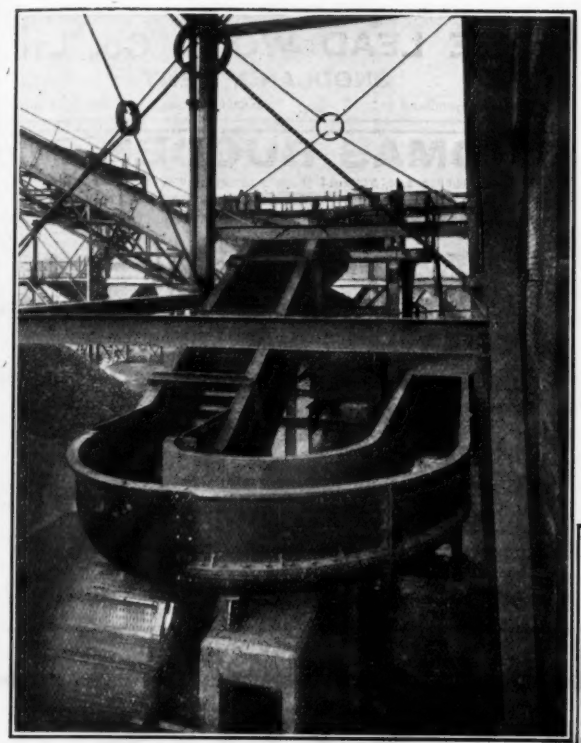

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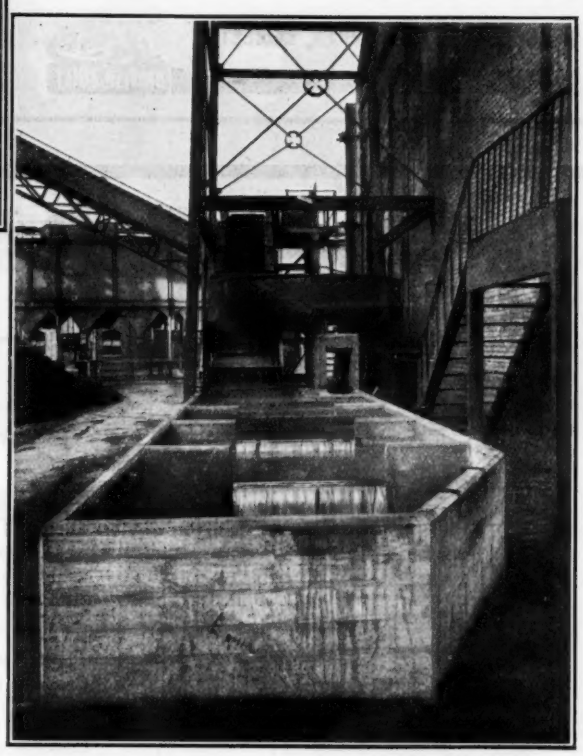

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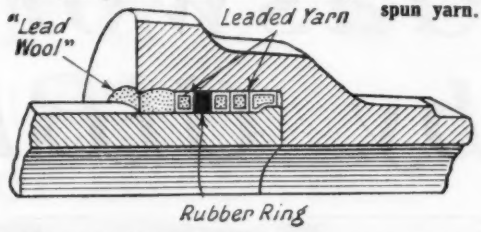
PATENT FLEXIBLE JOINT
for Gas Mains, with LEADED YARN in place of ordinary spun yarn.



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LARGEST MANUFACTURERS OF GAS MAIN BAGS.
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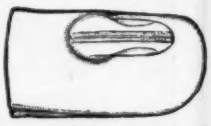
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& DRY VACUUM PUMPS FOR AIR OR GAS.

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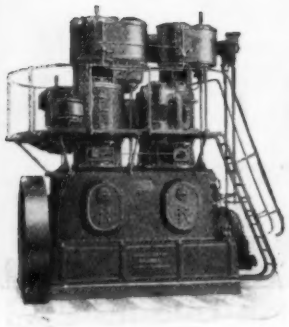

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Capacities up to 10,000 cu. ft. per min.

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Capacities up to 5,000 cu. ft. per min.

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Telegrams: "Reavell, Ipswich." Telephone Nos. 2124 & 2125 Ipswich.

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Over 200 prominent Gas Undertakings have placed Richmonds Sink Water Heaters on Simple Hire or long period Hire Purchase. Their choice is based upon close examination and test plus a shrewd foresight of future developments. Many thousands of "Newlyn" and "Lynton" Heaters have been fitted and thus Water Heater Services have been built on safe and sure foundations.

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Radiation

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The Back-Run Processes

outside of America where they have caused a Revolution in

Carburetted-Water-Gas Manufacture

These Processes and their Essential Developments are secured to H & G by Patents of Messrs. Young, Glasgow, Whitwell and Steere, Stelfox (two), Chrisman (two), and Steere (two).

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Among other H & G Revolutionary Productions with which these Back-Run Processes have been incorporated are:—

Self-Steaming Generators;
Safety Self-Operating Plant;
Self-Charging Generators;
Self-Clinkering Generators;
Complete-Gasification C-W-G Plant.

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Fortieth Anniversary Standards

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